XXXVII All-INDIA MEDICAL CONFERENCE, KANPUR :: JANUARY 4, 5 & 6 1962

INDEX NUMBER

JOURNAL

of the

INDIAN MEDICAL ASSOCIATION

VOLUME 37 NUMBER 12 CALCUTTA DECEMBER 16, 1961

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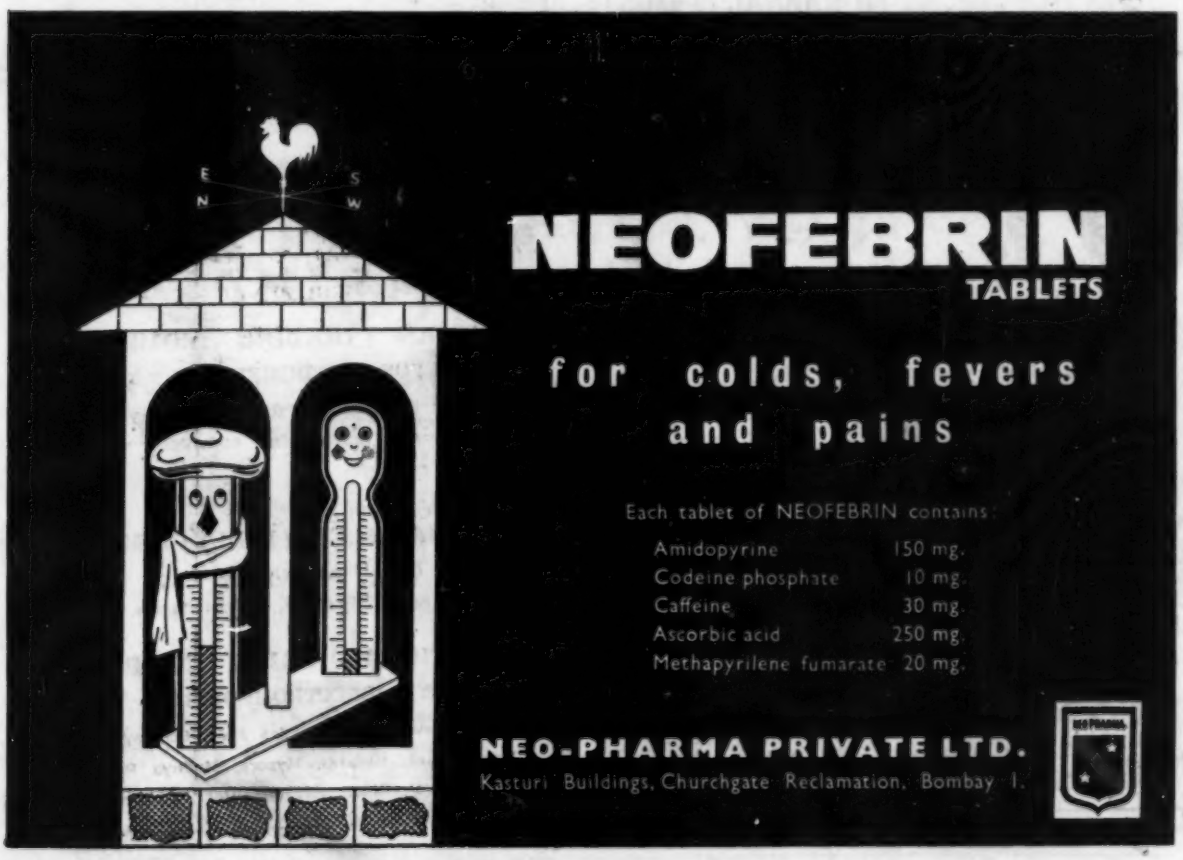

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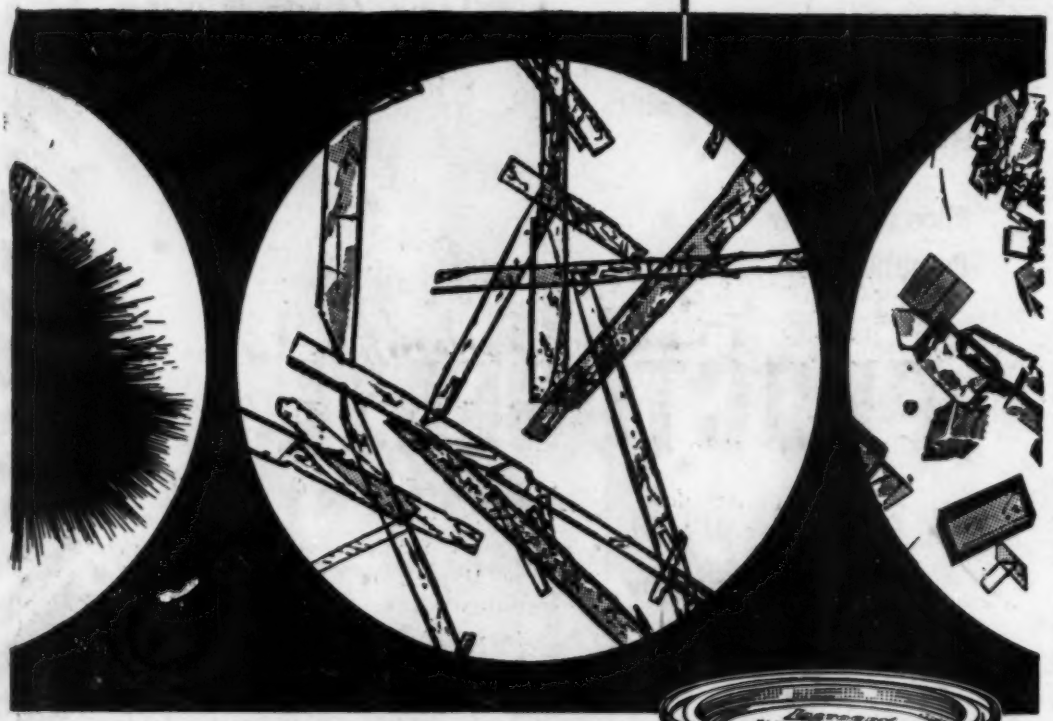

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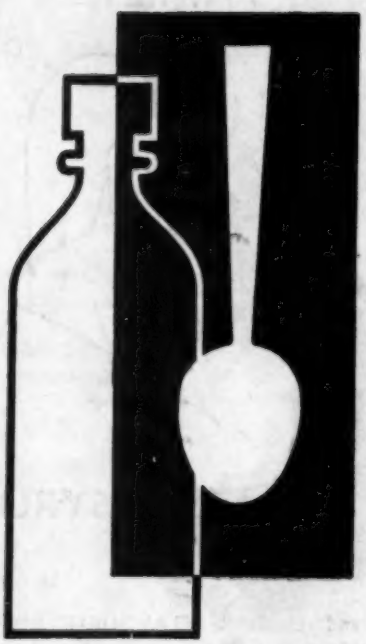

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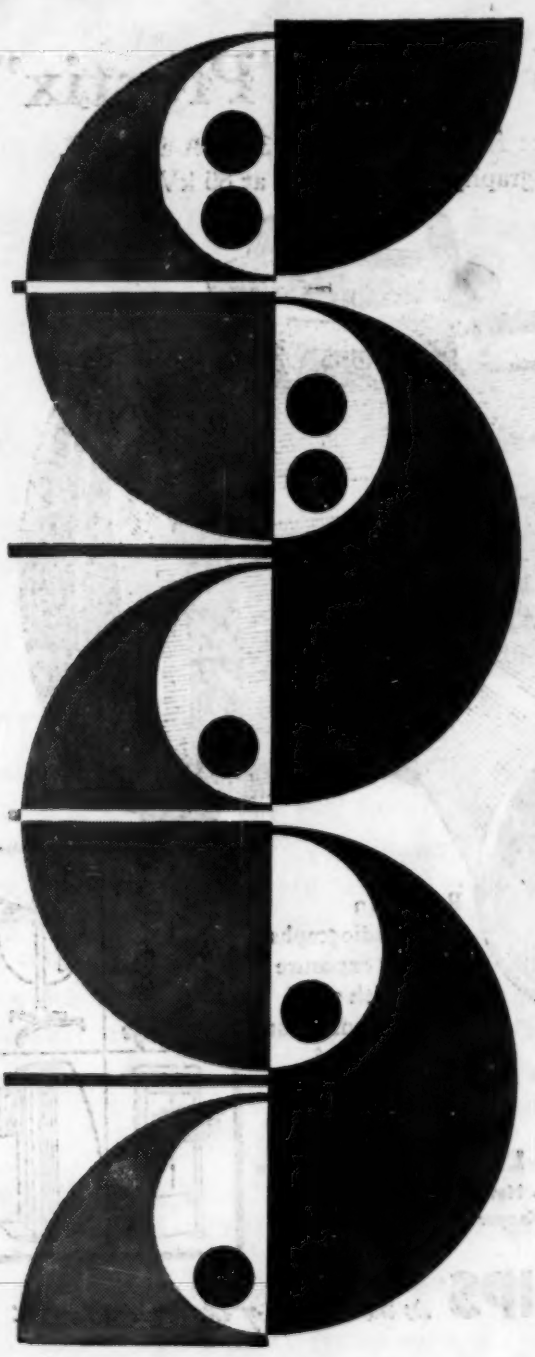

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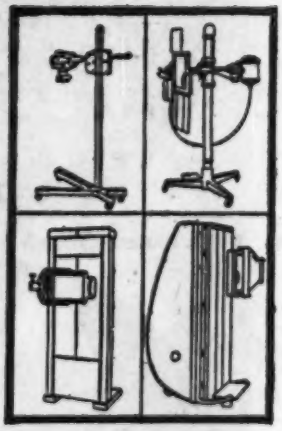

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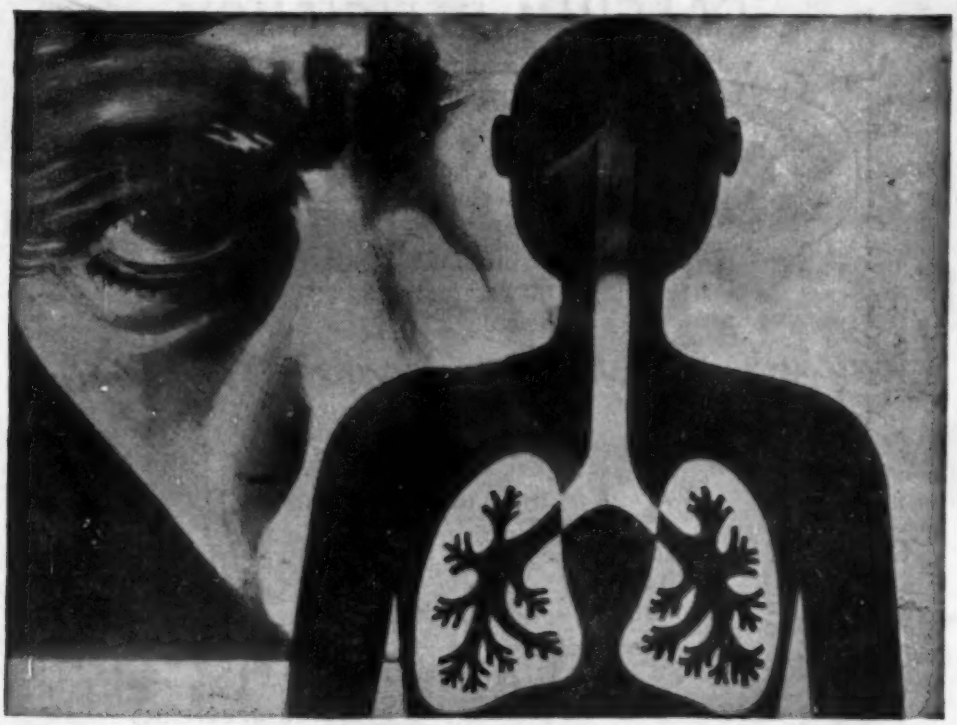

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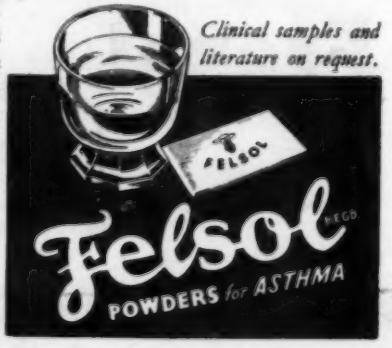

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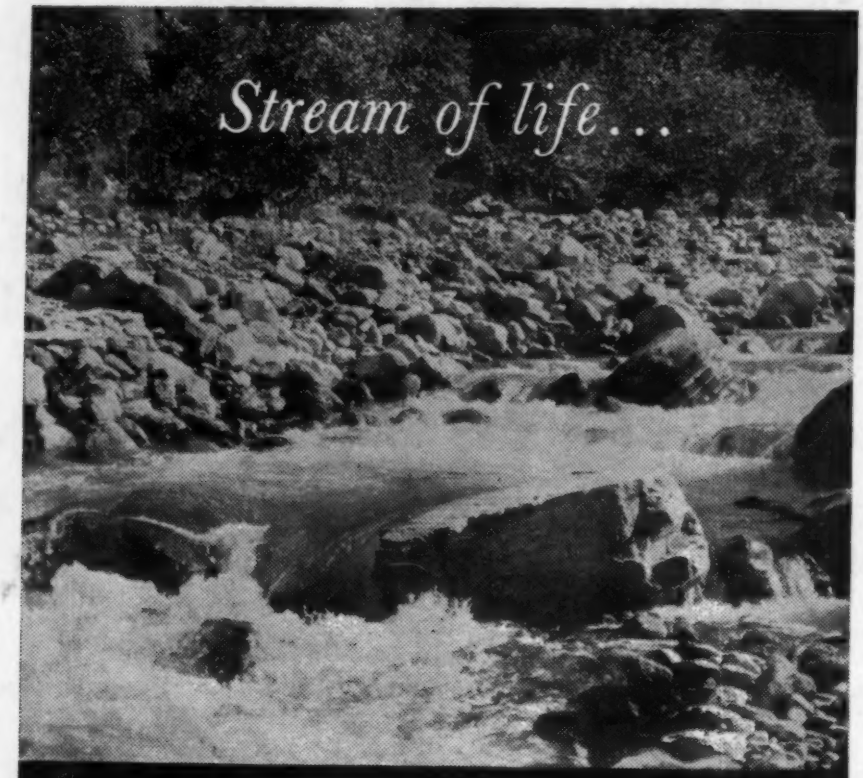

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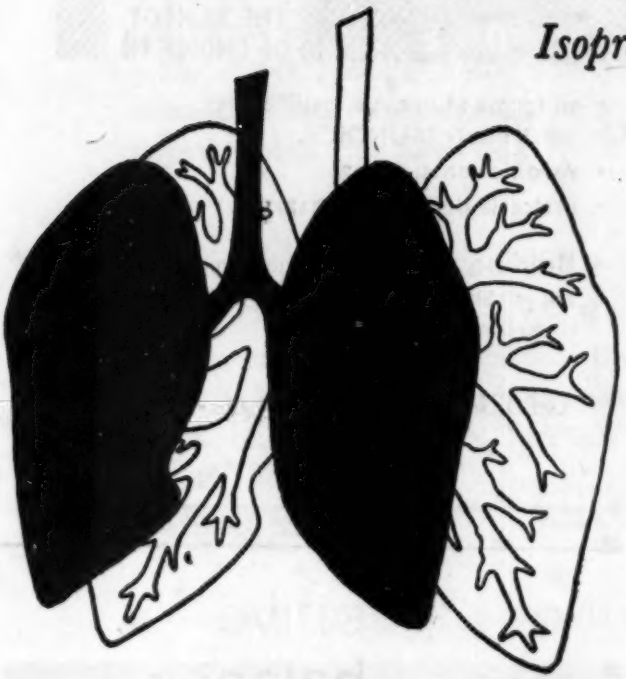

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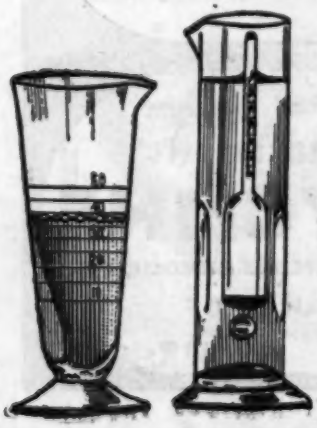

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Journal of the Indian Medical Association

VOLUME 37
NUMBER 12

PUBLISHED TWICE A MONTH
EDITOR—P. K. GUHA, M.B., M.R.C.S. (ENG.), D.O.M.S. (LOND.)

CALCUTTA
DECEMBER 16, 1961

ORIGINAL ARTICLES

ANTIMONY DEXTRAN COMPLEX IN THE TREATMENT OF LEISHMANIASIS

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The use of antimony compounds for the treatment of leishmaniasis by Vianna and Machado in 1913 forms an important landmark in the history of chemotherapy. During the fifteen years following the use of tartar emetic for the treatment of kala-azar by Di Cristina and Caronia in Italy and by Rogers, Muir and Brahmachari in India in 1915-16, the introduction of pentavalent antimony compounds such as urea stibamine and neostibosan led to the cure of over 90 per cent of cases of a disease which was regarded as fatal in about the same proportion of cases (Napier, 1943). These two drugs proved their great worth in the treatment of kala-azar in India and other countries, but have the disadvantage of intravenous administration and occasional hypersensitivity and toxic reactions. This led to the attempt at synthesis of antimony compounds which when administered intramuscularly would be equally effective and relatively free from toxicity. Of the various compounds introduced with this end in view, sodium stibogluconate and methyl glucamine antimoniate have proved useful. The former gives excellent immediate results but the relapse rate is high ; the latter is equally effective but with a lower relapse rate (Sen Gupta, 1953).

During the last two years, a stable solution of an antimony dextran complex has been introduced as suitable for intramuscular administration. The antimony in this preparation is in the pentavalent form. There have been different formulations of this compound (named BCA by the manufacturers) containing 1·45 and 5 per cent of Sb. In experimental animals, this drug has been found to be of very low toxicity on intramuscular injection, the LD_{50} being over 2000 mg. per Kg. body weight. On intramuscular injection of the drug, antimony was distributed to different parts of the body particularly in the spleen, the liver and the lymph glands and a fair concentration of Sb was noted in the skin 24-96 hours after an intramuscular injection. About 10-20 per cent of the Sb administered is excreted in the urine during the first 48 hours after the injection. Further excretion probably takes place during the subsequent days, but the concentration is too low for estimation (Golberg, personal communication).

This compound has been under clinical trial for the treatment of kala-azar and post-kala-azar dermal leishmaniasis (DL) at the School of Tropical Medicine, Calcutta, for about a year and a half. One case of oriental sore has also been treated with this drug. A note on the preliminary results in the treatment of the first six cases of kala-azar has already appeared (Sen Gupta *et al.*, 1960). In the present communication, the results obtained in the treatment of 19 cases of kala-azar, 7 of post-kala-azar dermal leishmaniasis and one of oriental sore are presented and discussed.

KALA-AZAR CASES :

Of the 19 cases of kala-azar, 18 were admitted into the Hospital for Tropical Diseases under the care of the senior author and one was treated at the Kala-azar Outpatients' Department of the

School of Tropical Medicine, Calcutta. Fourteen of these cases were of ordinary or previously untreated kala-azar and 5 were relapsed cases. All the patients were Indians or East Pakistanis ; 15 were males and 4 females and their ages varied from 7 to 50 years.

The duration of illness varied between 3 weeks and 7 months in the ordinary cases, and 6 months and 3 years in the relapsed cases. The patients showed splenic enlargement varying from 1½ to 8 inches below the costal margin. All were anaemic, the haemoglobin value in 13 out of 19 cases ranging between 5 and 8 g. per 100 ml. and the leucocyte count was less than 4000/c.mm. in 16 cases. The diagnosis of kala-azar was confirmed by demonstration of the parasite *Leishmania donovani* in smears of ilium, spleen or liver puncture material and/or serum tests, viz., Napier's aldehyde test and the complement fixation test for kala-azar carried out by the technique described by one of us (Sen Gupta, 1945). Analysis of the salient clinical features of the cases is presented in Protocol 1. There were no serious complications in most of the cases. Only two patients had albumin with R.B.C. and casts in the urine and one case had bronchiectasis and *E. coli* infection of the urinary tract.

Treatment—The antimony dextran complex BCA was the only drug used for specific treatment of kala-azar. Both the solutions containing 1·45 and 5 per cent antimony were used ; the former for the first 8 cases and partly for the 9th case that had 5 per cent solution subsequently ; the rest of the cases were treated with the 5 per cent solution only. The drug was administered by the intramuscular route and doses as high as 15 ml. did not cause any great discomfort. The injections were given on alternate days in most cases and the number of injections varied from 10-15 in a course. The dosage varied widely in different cases because of variation of strength of the solution of Sb and because some of the cases required more than one course of injections. Larger doses were employed in later cases as it became obvious that large doses were well tolerated by man. The total dose calculated in terms of antimony in grammes varied from 0·7 to 21·50 and the relative total dose per 100 lb. body weight varied from 1·27 to 27·3 g.

The complications present in different cases were treated symptomatically.

Results—The fever usually subsided after 6-8 injections in most of the cases responding to treatment (Fig. 1). The patients who were afebrile at the commencement of treatment had occasional rise of temperature during the first few injections (Fig. 2). This is quite usual with most antimony compounds.

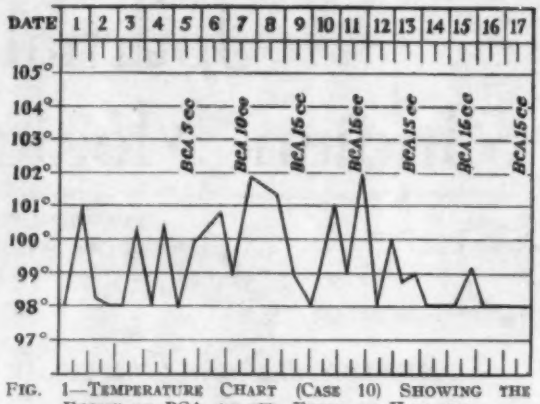

FIG. 1—TEMPERATURE CHART (CASE 10) SHOWING THE EFFECT OF BCA ON THE FEVER OF KALA-AZAR

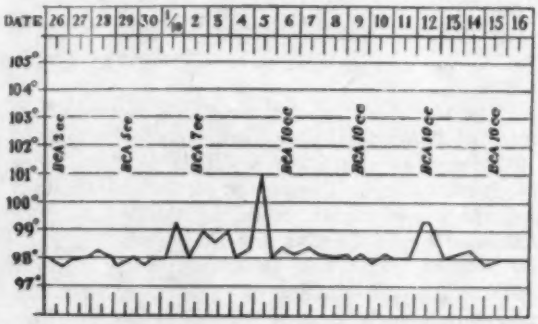

FIG. 2—TEMPERATURE CHART (CASE 7) SHOWING OCCASIONAL RISES OF FEVER DURING THE COURSE OF INJECTIONS OF BCA

There was considerable gain in weight in most of the cases—3 patients showing a gain of 10-15 lb., 10 of 6-10 lb., and 4 of 2-5 lb. in weight. The cases with oedema had initial loss of weight due to disappearance of oedema.

Marked shrinkage of splenic enlargement was noted in the cases responding to the drug, 13 showing slight or no splenic enlargement 2 weeks or more after treatment.

There was distinct improvement in the haemoglobin value and leucocyte count after treatment. The details are presented in Table 1 and Protocol 1.

Based on the following criteria of clinical cure, viz., cessation of pyrexia, improvement of general health, well marked shrinkage of the splenic enlargement, improvement of haemoglobin value and leucocyte count reaching more or less the normal range, being present, 12 out of the 14 ordinary cases and 4 out of 5 relapsed cases could be regarded as cured. In two ordinary cases and

TABLE 1—SHOWING ANALYSIS OF CASE RECORDS OF PATIENTS TREATED WITH ANTIMONY DEXTRAN COMPLEX

	Total	Ordinary	Relapsed
No. of cases ...	19	14	5

Sex ... Total : 19; Male : 15; Female : 4.

Age

Years	1-10	11-20	21-30	31-40	41 & above
No. of cases	3	7	6	nil	3

Duration of illness

Months	0-3	4-6	7-9	10-12	Over 12
No. of cases :					
Ordinary	4	8	2	—	0
Relapsed	0	0	3	—	2

Size of the spleen

Inches below costal margin ...	0-1	>1-2	>2-3	>3-4	>4-5	>5-6	>6-7	>7
No. of cases before treatment ...	0	5	2	4	5	0	2	1
No. of cases after treatment ...	11	2	4	1	1	0	0	0

Gain in weight

in lb.	1-5	6-10	11-15
No. of cases	4	10	3

Haemoglobin content of blood (g./100 ml.)

	5-6	6·1-7	7·1-8	8·1-9	9·1-10	10·1-11	11·1-12	12·1-13	13·1-14	14·1-15
No. of cases before treatment	3	4	6	1	2	2	1	0	0	0
No. of cases after treatment	0	0	0	3	1	4	1	4	3	2

Leucocyte count (1000/c.mm.)	1-2	2·1-4	4·1-6	6·1-8	8·1-10	10·1 & above
No. of cases before treatment ...	4	12	1	2	0	0
No. of cases after treatment ...	0	0	8	6	2	1

Diagnosis

Aldehyde test ... ... Positive : 13; doubtful : 3; negative : 3

Complement fixation test ... Strongly positive : 9; positive : 8; anticomplementary serum : 2

L.D. bodies present in spleen 1, ilium 16, liver 1.

Treatment

Total dose (Sb in g.) : range 0·74—21·50; mean 7·14

Relative total dose/100 lb. body weight (Sb in g.) : range 1·27—28·24; mean 10·86

Result

Immediate ... ... Cure : 16, failure : 3

Final ... ... Well for 6-14 months : 10 cases; Well for 3-4½ months : 2 cases; Relapsed : 1 case; Lost sight of : 3 cases

PROTOCOL I—SUMMARY OF THE CASE NOTES OF PATIENTS TREATED WITH ANTIMONY DEXTRAN COMPLEX

Serial No. of cases	1	2	3	4	5	6	7R	8	9R	10	11	12	13R	14R	15	16R	17	18	19
Age (years)	18	22	10	22	45	24	52	11	7	26	21	20	12	14	9	21	50	17	12
Sex	M	F	M	M	M	F	M	M	M	M	M	M	M	M	M	M	F	F	M
Weight (lb.)	—	80	32	106	95	79	85	46	35	78	99	94	68	75	41	106	81	65	53
Duration of illness (months)	7	3	5	3	7	2	36	7	18	¼	6	5	9	6	7	6	6	4	6
Spleen (inches below costal margin)	4	5	3	6½	2	4½	4	2	4	1½	5	3	2	8	4	5	2	7	5
Haemoglobin (g./100 ml. before treatment)	5·9	8·2	10·5	6·8	9·9	7·1	6·1	10·5	5·9	9·4	7·5	11·2	7·8	5·1	7·1	6·5	6·1	7·1	7·8
Leucocyte count (×1000/c.mm.)	2·0	1·5	2·9	1·2	2·8	1·6	2·5	7·3	2·7	4·4	3·5	6·7	2·5	2·6	3·2	3·9	3·5	2·5	2·6
Aldehyde test	++	Neg.	++	Neg.	++	±	+++	+++	++	+++	+++	Neg.	(+)	+++	(+)	+++	++	++	+++
Complement fixation test	++	++	++	++	+	+	+	+	+	++	Ac	++	+	Ac	+	++	++	++	+
L.D. bodies	—	Spl. ++	Il. Sc.	Il. Sc.	Il. +	Il. +	Il. +	Liv. +	Il. +	Il. Sc.	Il. +++	Il. Sc.	Il. ++	Il. Sc.	Il. +	Il. Sc.	Il. +	Il. +	Il. +
Total dose of BCA (Sb. in g.)	3·23	1·38	0·74	1·54	1·22	1·48	2·96	2·35	7·66	10·50	10·50	10·5	8·0	21·5	6·25	10·55	9·8	10·75	14·75
Relative total dose per 100 lb. body weight	—	1·72	2·31	1·45	1·27	1·87	3·84	5·0	21·88	13·46	10·6	11·17	11·76	28·24	15·24	9·86	12·1	16·5	27·3
No. of injections	23	15	12	13	9	11	11+11	18	18+10	15	15	15	15	15+15	15	15	14	21	15+15
Days after treatment	After 17 inj.	15	18	15	25	8	After 20 inj.	10	After 28 inj.	14	8	19	14	13	11	14	—	6	After 30 inj.
Haemoglobin (g./100 ml.)	8·2	13·6	13·6	10·5	12·2	8·8	8·5	12·2	12·8	14·3	13·3	14·5	10·5	11·1	10·2	10·2	—	9·9	12·8
Leucocyte count (×1000/c.mm.)	5·0	4·1	7·9	4·8	7·5	4·7	5·7	13·3	8·6	5·2	11·7	7·8	9·1	7·8	6·7	7·2	—	3·5	4·5
Spleen (inches below costal margin)	P	2½	0	2½	P	P	4	P	1	P	P	½	P	3	1½	1	—	5	3r
Weight (lb.)	—	87	39	110	96	91	92	52	43	93	105	109	75	84	45	116	—	69	60
Immediate result	C	C	C	C	C	C	f	C	C	C	C	C	C	C	C	C	f	f	C
Final result	—	C	—	Relapse	C	C	—	C	Well 4½ mths.	Well 3 mths.	C	C	C	C	C	C	—	—	—

R=relapsed case; M=male; F=female; Spl.=spleen; Il.=ilium; Liv.=liver puncture smear; Sc.=scanty; C=cured; f=failure; P=just palpable. Ac=anticomplementary; r=reducible above costal margin

one case of relapse the drug proved ineffective. Brief notes of these cases are presented below.

Case 7—M. S., male, aged 52, was admitted for fever and splenomegaly for three years, associated with weakness and loss of weight. He was diagnosed as having kala-azar 1½ years ago and treated with sodium stibogluconate without much effect on the spleen, but his periods of pyrexia were definitely less than before. On admission, he had splenic enlargement of 4" below costal margin. He was having occasional attacks of fever rising to 100°F.; P/R 94/20; haemoglobin 6·12 g. per cent, W.B.C. 2500 per c.mm.; urine showed albumin, granular and hyaline casts, R.B.C. and pus cells. He was given 11 injections of antimony dextran complex in the hospital and this course was followed subsequently by another 11 injections at the outpatients' department, with only slight improvement. He was subsequently treated with stilbamidine with satisfactory results.

Case 17—B. D., Indian female, aged 50, was admitted for fever associated with abdominal pain and loss of weight for six months. The patient was thin, poorly nourished, anaemic and had hepatic and splenic enlargement of 2" below the costal margin in each case. She had 14 injections of antimony dextran complex between 11-5-1960 and 10-6-1960 but her fever was unaffected. She next had haemoptysis due to bronchiectasis and later developed *E. coli* pyelitis. She was subsequently treated with sodium stibogluconate followed by urea stibamine for kala-azar and antibiotics for urinary tract infection, and she could be discharged as cured after a little over four months in the hospital.

Case 18—M. R. D., Indian female, aged 17 years, was admitted for intermittent fever that commenced four months before admission, and was associated with severe anaemia and enlargement of the liver and spleen. The latter was enlarged 7" below the costal margin and was very firm. The patient gave a history of enteric fever a year previously (probably, enteric-like onset of kala-azar). She had 15 injections of antimony dextran complex between 19-7-60 and 20-8-60 but there was only slight improvement in her general condition and the spleen was practically unaffected. She was given a second course of 17 injections of antimony dextran complex between 4th and 16th September, 1960 but there was no sign of any improvement. On the other hand, she showed some R.B.C. in the urine. She was subsequently treated with urea stibamine and aminostiburia and could be discharged as 'improved' after 4½ months of stay in the hospital. Her spleen at the time of discharge was enlarged to 2" below the costal margin and her haemoglobin had risen from 7 to 10·88 g. per 100 ml. of blood.

Follow-up—Attempt was made to follow up the 16 cases, who could be discharged from the hospital (or the outpatients' clinic) as clinically cured. Three of them could not be traced subsequent to their discharge from the hospital. Two cases could be followed up for 3-4 months and were found to be in good health ; they were lost sight of subsequently. Eleven cases could be followed up for six months or more ; ten were found to be free from all symptoms and signs of kala-azar and one had relapse of the disease.

POST-KALA-AZAR DERMAL LEISHMANIASIS (DL) :

Seven cases of DL have so far been treated and examined at the termination of the treatment and/or a few months later. Further trials are in progress, but the results obtained on these 7 cases are presented briefly below :

The patients were Indian males, their ages varying between 16 and 50 years. The duration of dermal leishmanoid varied from 1-13 years. All gave previous history of kala-azar and of cure of the visceral disease following specific treatment or spontaneously. All the cases had lesions of three types, viz., hypopigmented macules, erythema and nodules. The diagnosis was based on characteristic history and clinical features. The injections were administered twice a week at the kala-azar outpatients' department. The number of injections varied from 16 to 50 in different cases.

It was noted that most of the cases had definite improvement fairly early during the course of injections and the erythematous and nodular lesions subsided earliest. The hypopigmented lesions were persisting to the end of the course of injections, though there was a definite decrease in the hypopigmentation or in the number of patches. One patient having hypopigmented patches all over the body, erythema and nodules on the face was found to be completely cured after about six months of treatment. Five other patients who were treated could be recorded as markedly improved. In one case the improvement was slight and the patient had to be treated with urea stibamine.

ORIENTAL SORE :

Only one case of oriental sore was treated with the drug without apparent improvement.

S. N., a Marwari male child, aged 5 years had oriental sore on the tip of the nose for about 7 to 8 months. He was given 72 ml. (1·04 g. Sb) of antimony dextran complex in 15 injections. No local treatment beyond saline compresses was administered. This patient showed no improvement.

Discussion

It will be noted from the results of this clinical trial of the antimony dextran complex in kala-azar that 16 out of 19 cases treated could be regarded as clinically cured of the disease and that on follow-up 10 out of 11 cases remained well for over 6 months and were thus very probably permanently cured of kala-azar. Two more cases are known

to have remained free from symptoms of kala-azar for 3-4½ months. According to Napier (1932) there is little chance of relapse of kala-azar when a patient remains free from all symptoms of kala-azar for six months after clinical cure following specific treatment and those remaining well for 4 months have fair chance of cure because symptoms of kala-azar usually commence before three months in majority of cases that relapse.

In view of the smallness of the number in the present series of cases (due to the well marked decrease of incidence of kala-azar in India), it is probably justifiable to compare the results with those obtained with methyl glucamine antimoniate (MGA) by one of us (Sen Gupta, 1950). With MGA, 22 out of 24 cases were cured and the drug was unsuccessful in 2 cases ; and there was relapse of kala-azar in 1 out of 11 cases followed up for more than six months. On comparison of these data with those in the present trial by the χ^2 test, no statistically significant difference could be noted. The drug thus appeared to be similar in therapeutic action to methyl glucamine antimoniate which is one of the effective anti-kala-azar drugs.

As regards the dosage required for the cure of kala-azar, an approximate idea may be had by considering the amount of antimony administered to the cases responding favourably to treatment. It has been found that in an adult an average amount of the drug equivalent to about 6 g, of antimony was required. But it was felt that a higher total dose of about 10 g. Sb for an adult was preferable in order to prevent relapse (there was relapse in a case having a total dose of 1·54 g.). The average total dose administered to 7 children who were cured was 8·75 g. Sb. But three of these were relapsed cases of kala-azar and one a particularly severe ordinary case. These 4 cases needed more than one course of injections ; thus a high total dose of the drug was necessary. The dose administered in a single course of injection was on an average equivalent to 5·6 g. of antimony.

In post-kala-azar dermal leishmaniasis, the results obtained in the 7 cases have been quite encouraging and were comparable with those obtained with older pentavalent antimony compounds. Further clinical trials would throw more light on this point.

As for oriental sore, we could treat only one case and the drug did not appear to be useful.

Summary

1. An antimony dextran complex (BCA) was employed for the specific treatment of 19 cases of kala-azar ; sixteen of the patients fulfilled the criteria of clinical recovery and the drug was unsuccessful in 3 cases. Average total dose of the drug required for the cure of kala-azar was the equivalent of about 10 g. of Sb for adults and 5·6 g. of Sb for children in one course of injections.

On follow-up of the 16 cases discharged as clinically cured, 3 were lost sight of, 2 were known to be well for 3-4 months and of 11 patients followed up for 6-14 months, 10 were free from symptoms and thus permanently cured of kala-azar ; one had relapse of the disease.

The results of clinical trial in kala-azar are similar to those obtained with one of the effective pentavalent antimony compounds, viz., methyl glucamine antimoniate.

2. Seven cases of post-kala-azar dermal leishmaniasis were treated ; all the cases except one showed well marked improvemnt.

3. The drug did not prove to be of value in the single case of oriental sore treated.

Acknowledgment

We are thankful to Bengers Laboratories Ltd., England, and to their Indian office for a generous supply of the antimony dextran complex BCA/1 and BCA/5.

References

Napier, L. E.—*Indian J. M. Res.*, **19** : 705, 1932.

Idem—Principles & Practice of Tropical Medicine, 1943. Thacker Spink, Calcutta.

Sen Gupta, P. C.—*Indian M. Gaz.*, **80** : 396, 1945.

Idem—Ibid., **85** : 291, 1950.

Idem—Ibid., **88** : 20, 1953.

Sen Gupta, P. C., Chatterji, Anjali and Mukherjee, A. M.—*Bull. Calcutta School Trop. Med.*, **8** : 6, 1960.

BLOOD GLUTATHIONE IN HYPERPYREXIA

A Preliminary Study

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Glutathione, a tripeptide, and glutamyl cystinyl glycine, plays a very important role in the oxidation-reduction system of the cell. It is generally believed that not only glutathione acts

as a H^+ acceptor but also its components take part in the metabolic processes. In the plant and animal kingdom, it is needless to stress the role of the tripeptide along with ascorbic acid in keeping adrenaline and noradrenaline in reduced condition and in the respiratory processes of the lens of the eye which contains high concentration of glutathione (343 mg. per 100 g. of fresh tissue). Mapson and Moustafa (1956) suggested a multisystem consisting of glutathione reductase, dehydro ascorbic acid oxidase, catalysing the transfer of electrons from TPNH to oxygen. Hanes (1950) has shown the role of glutathione in transpeptidation reactions. Waelsch (1952) proposed the role of glutathione in the biosynthesis of proteins. Lazarow (1949) observed that glutathione protects the islet cells against degeneration caused by alloxan diabetes. Griffiths (1948) experimentally produced uric acid diabetes by restricting the intake of dietary glutathione. Conn *et al.* (1948) observed that the temporary diabetes induced in human beings by injections of ACTH, is attended by a rise in uric acid and fall in glutathione level of blood. Further administration of glutathione ameliorated the diabetic condition and it was inferred that glutathione level decreased by interaction with toxic substances.

Normally the conversion of haemoglobin to methaemoglobin takes place in the circulating blood. In order to prevent accumulation, glutathione (which is present in high concentration in erythrocytes) reduces methaemoglobin to haemoglobin.

Considering the important functions of glutathione, it was thought worthwhile to estimate the glutathione and ascorbic acid level in blood in patients suffering from encephalitis, enteric fever with encephalopathy, and pneumonia without any mental symptoms. Patients admitted to the paediatric department of Irwin Hospital, New Delhi, were selected for the study.

Material and Methods

Glutathione was estimated according to the iodometric titration method of Woodward and Fry (1932). The details are also given by Patterson and Lazarow (1955). Ascorbic acid content was determined by titrating the protein free filtrate with 2 : 6 dichlorophenol indophenol (Woodward, 1935). The only alteration in procedure as adopted by the authors was in preparation of the protein free filtrate by using 2/3 N sulphuric acid and 10 per cent sodium tungstate solution.

Blood glutathione and ascorbic acid levels were estimated in a few normal children and also in 37 patients suffering from hyperpyrexia (Table 1). Simply glutathione estimation in blood was undertaken in 9 cases of encephalitis, 9 cases of enteric fever with encephalopathy and 6 cases of pneumonia without any mental symptoms.

Results

It is seen from Table 1, that the blood glutathione level in hyperpyrexial states was lower than normal.

Table 1—Showing Blood Glutathione and Ascorbic Acid Level in (1) Normal Adults, (2) Normal Young Healthy Children and (3) Patients Suffering from Hyperpyrexia

Subject	Blood glutathione level (mg. per cent)	Blood ascorbic acid level (mg. per cent)
Normal adults ...	15 to 20	0·5 (minimum normal)
Present series :		
Normal healthy young children	15 to 25	0·5 to 10
Patients suffering from hyperpyrexia (37 cases) ...	8·12 ± 0·42	0·46 ± 0·06

Analysis of results (Table 2) reveals that blood glutathione level in fatal cases was less than 6 mg. per cent (ranging from 3 to 6 mg. per cent) whereas in patients who survived, the figure was higher and ranged between 7·2 and 18·4 mg. per cent. However in cases no. 9, 12 and 14, who survived, the blood glutathione level was lower. These three patients had a stormy course and had 26 days' average stay in hospital. In the six cases of pneumonia, the blood glutathione level ranged from 6·5 to 10·9 mg. per cent.

Discussion

Anand *et al.* (1958) observed a significant lowering of glutathione and acetylcholine content in heart muscles, hypothalamus and frontal lobe in 14 days with an average drop of body temperature to 14·5°C, whereas in the temporal lobe of the experimental dogs there was a significant increase of these constituents. On the basis of these findings they suggested administration of acetylcholine and glutathione in hypothermia.

According to Bowman *et al.* (1934) fever elevates the G—SH index, but they could not corelate G—SH level with rise of temperature and duration of illness. In their opinion, elevated metabolic rate may not be responsible because

TABLE 2—SHOWING BLOOD GLUTATHIONE LEVEL IN (1) ENCEPHALITIS, (2) ENTERIC FEVER WITH ENCEPHALOPATHY AND (3) PNEUMONIA WITHOUT MENTAL SYMPTOMS

Duration of illness	Convulsion	Consciousness	Blood glutathione level (mg. %)	Results
ENCEPHALITIS				
12 hours	Yes	Unconscious	18·4	Recovered
5 days	No	Conscious	8·4	Died
4-5 days	Yes	Unconscious	6·0	do.
2 days	do.	do.	3·0	do.
3 days	do.	do.	14·0	Recovered
2 days	do.	do.	7·5	do.
2 days	do.	do.	5·9	Died
6 days	do.	Semi-conscious	5·0	do.
10 days	do.	do.	8·0	Recovered
15 days	do.	Improved	72·0	
ENTERIC FEVER WITH ENCEPHALOPATHY				
3 days	Yes	Semi-conscious	5·75	Recovered
—	do.	do.	4·0	
—	No	Improved	4·8	
13 days	Yes	Semi-conscious	9·3	do.
5 days	do.	do.	7·6	Died
18 days	do.	do.	4·7	Recovered
20 days	do.	do.	3·1	Died
10 days	do.	do.	4·1	Recovered
15 days	do.	do.	7·0	Died
—	do.	do.	15·0	
12 days	do.	do.	12·0	Recovered
1 month	do.	do.	13·0	do.
PNEUMONIA				
1 day	No	Conscious	9·5	Cured
3 days	do.	do.	9·5	do.
2 days	do.	do.	7·4	do.
4 days	do.	do.	10·9	do.
2 days	do.	do.	7·9	do.
2 days	do.	do.	6·5	do.

experimental hyperthyroidism in animals lowers blood G—SH index. The elevating effect of fever might simply be related to accelerated protein catabolism. Therefore it seems likely that with increase in anabolic rate, not only the basic catabolic rate of protein, fat and carbohydrate is increased, but also the active substances such as glutathione are also used up. This may be true, because the two constituents of glutathione, viz., glycine and cystine take part in detoxication mechanism and glutamic acid on oxidative deamination gives rise to ketoglutaric acid which may be used up through the Kreb's cycle.

SUMMARY AND CONCLUSION

Blood glutathione level was estimated in a few normal healthy children, 37 patients suffering from hyperpyrexia, 9 cases of encephalitis, 9 of enteric fever with encephalopathy and 6 of pneumonia without any mental symptoms.

Blood glutathione level was found to be appreciably low in patients suffering from hyperpyrexia. Explanations are put forward for this change.

In fatal cases, the maximum glutathione level was 6 mg. per cent and in other cases it ranged from 3 to 6 mg. per cent.

In patients who survived, the blood glutathione level ranged from 7·2 to 18·2 mg. per cent.

In pneumonia cases without any mortality, the glutathione level in blood was found between 6·5 and 10·9 mg. per cent.

ACKNOWLEDGMENT

Thanks are due to Col. B. L. Taneja, Principal, and Dr. B. P. Sinha, Professor of Physiology, Moulana Azad Medical College, New Delhi, for their keen interest in this work.

REFERENCES

ANAND, B. K., BALDEV SINGH, MALHOTRA, C. L., PUNDLICK, P. S. AND CHHINA, G. S.—*Indian J. M. Res.*, **46**: 21, 1958.

BOWMAN, R. O., *et al.*—Quoted in 'Glutathione': A symposium (Editors Colowick, S., Lazarow, A., Racker, E., Sch. Warz, D. R., Stadman, E. and Waelsch, H.), 1954, Academic Press, Inc., New York, p. 300.

CONN, J. W., LOUIS, L. H. AND WEELER, D. S.—*J. Lab. Clin. Med.*, **33**: 651, 1948.

GRIFFITHS, M.—*J. Biol. Chem.*, **172**: 853, 1948.

HANES, C. S.—*Nature*, **166**: 288, 1950.

LAZAROW, A.—*Physiol. Rev.*, **29**: 48, 1949.

MAPSON, L. W. AND MOUSTAFA, E. M.—*Biochem. J.*, **62**: 248, 1956.

PATTERSON, J. W. AND LAZAROW, A.—In Methods of Biochemical Analysis, Vol. II, 1955, Interscience Publishers Inc., New York, p. 259.

WAELSCH, H.—*Advances in Enzymol.*, **13**: 237, 1952.

WOODWARD, G. E. AND FRY, E. G.—*J. Biol. Chem.*, **97**: 465, 1932.

WOODWARD, G. E.—*Ibid.*, **109**: 1, 1935.

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1. Russek, H.I.: Am. J. Cardiol. 3:547 (April) 1959.

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PREOPERATIVE SEDATION IN TONSILLECTOMY

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A suitable method of preoperative sedation in tonsillectomy, particularly for the very young, is much needed. Though various methods have been mentioned, no single drug has so far been found satisfactory. A combination of promethazine hydrochloride and butobarbitone was tried for this purpose in Surat General Hospital on 100 cases of tonsillectomy.

Methods and Materials

The cases were divided into two age-groups. Group 1 consisted of 30 cases between 5 and 7 years. Group 2 consisted of 70 cases between 8 and 10 years. In group 1, a combination of promethazine hydrochloride 15 mg. and butobarbitone 75 mg. was administered at 10 P.M. on the night prior to the day of operation and the same dose was repeated next day, ½ hour before operation. In group 2, a combination of promethazine hydrochloride 30 mg. and butobarbitone 150 mg. was administered once only at 10 P.M. on the night prior to the day of operation.

The anaesthesia used was as follows: Induction with ethyl chloride and aether—nasal intubation followed by N_2O+O_2+aether sequence.

The majority of tonsils were guillotined and very few were dissected.

Results

The cases were studied with special reference to the nature of sleep (pre-operative) on arrival at the operation theatre, easiness of induction, any sign of respiratory depression during anaesthesia, amount of relaxation and incidence of post-operative vomiting and sedation required during post-operative period. Also, recovery period in minutes after completion of anaesthesia was noted in all these cases. Detailed analysis of the above points is given in Table 1.

Comments

It is evident from Table 1 that in the majority of children induction was easy, relaxation excellent, and incidence of postoperative vomiting negligible. As most of the children emerged from anaesthesia in a restless manner the incidence of cases requiring postoperative sedation was rather high. Recovery from anaesthesia varied between 15 minutes and 25 minutes in spite of fairly deep anaesthesia.

Table 1—Showing Detailed Analysis of Author's Series of Tonsillectomies after Preoperative Sedation with Combination of Promethazine Hydrochloride and Butobarbitone

Cases		Group 1 (5-7 years) (30 cases)		Group 2 (8-10 years) (70 cases)	
		No. of cases	% of total	No. of cases	% of total
Deep sleep		12	40	30	42·8
Light sleep		10	33·3	35	50
Total ...		22	73·3	65	92·8
Easy induction ...		28	93·3	64	91·4
Respiratory depression ...		nil	...	nil	...
Relaxation		30	100	70	100
Postoperative vomiting ...		2	6·6	5	7
Postoperative sedation required		27	90	64	91
Recovery in minutes	5	1	3·3	nil	nil
	10	1	3·3	6	8·5
	15	12	39·6	20	28·5
	20	11	36·3	14	20
	25	4	13·2	25	35·7
	30	1	3·3	5	7·1

Conclusion

A combination of promethazine hydrochloride and butobarbitone comes as near as possible to the ideal premedication for tonsillectomy especially for the young.

Acknowledgment

I express my thanks to Dr. B. B. Bhatt, C.M.O., Surat General Hospital, for permitting me to publish this article.

The drug used by the author was Sonergan (May & Baker), a combination of promethazine hydrochloride 15 mg and butobarbitone 75 mg.

THE ROLE OF COPPER IN VITILIGO

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During the last three decades a great deal of work has been carried out on copper metabolism and biochemistry of copper proteins has been described by Nelson and Dawson (1944), Dawson

and Mallette (1945), Cartwright (1950), and Dawson and Tarpley (1951). The functions of this element are gradually coming to light. Copper is either an essential constituent of certain enzymes or an agent responsible for their activity. These enzymes are catalase, tyrosinase, serum oxidase, ascorbic acid oxidase, cytochrome, cytochrome oxidase and uricase. In conjunction with iron, copper is essential for haemoglobin synthesis and a protein-haemocuprine has been established to be present in red blood cells of mammals. Haemocyanin, another copper protein, is present in the blood of certain vertebrates and serves the purpose of oxygen carriage. In the brain, copper is also important for the formation of myelin in the nervous system.

The total quantity of copper in the human body is about 100-150 mg. of which 64 mg. is present in the muscles, 23 mg. in the bones and 18 mg. in the liver which contains a higher concentration of copper than any other organ. Further, copper in the foetal liver is five to ten times higher than in the liver of an adult. Both blood cells and serum contain copper. The copper content of red blood cells is constant while that of serum is highly variable 80 to 150 μg. per 100 ml. (Mann and Keilin, 1938 ; Vallee, 1952). Cartwright *et al.* (1954) found that cerebrospinal fluid contained 50 per cent of dried reacting copper and remaining indirect or combined copper. The results of Thompson and Watson (1949) and Cumming *et al.* (1955) can be summarised as follows: Copper is bound to globulin (25 per cent), β globulin (50 per cent) and γ globulin (20 per cent) while 5-10 per cent of the copper would be estimated as direct reacting and negligible amounts could be detected in the albumin fraction.

Holmberg and Laurell (1948, 1951) isolated caeruloplasmin, and blue copper protein complex with a molecular weight of about 1,51,000 from pig and human blood. They further showed that copper was combined with globulin fraction and possessed serum oxidase activity which could be detected by using p-phenylenediamine as the substrate. Various studies have been done on the metabolism of copper in Wilson's disease (Cumming *et al.*, 1955 ; Lahey *et al.*, 1953). Not only is the copper level in serum decreased in this condition but the excretion of this element in urine is also increased. In nephrotic syndrome, plasma iron binding capacity and plasma copper content are abnormally low owing to the urinary excretion of these components with proteins (Holmberg and Laurell, 1948). Total plasma copper, caeruloplasmin and serum oxidase activity are raised in pregnancy and chronic infection. Hypercupraemia in pregnancy recedes within 10 to 20 days after parturition (Vallee, 1952).

The cytochemistry of melanin formation in melanocytes has been described by Fitzpatrick and Szabo (1959) and Lerner and Case (1959). Melanin is a protein conjugate formed by the association of quininoid polymer (indole 5-6 quinone) which is derived from tyrosine by the action of tyrosinase, a copper containing enzyme. The metabolic effects of tyrosinase in turn require the presence of vitamin C and folic acid. Anwar El-Mofty *et al.* (1959) have shown in the rat, the mobilisation of liver copper with the consequent rise in the blood copper levels by the administration of ammoidin (8 methoxy psoralen) which also effects the drop of glutathione content of blood. It is also well known that substances like glutathione and cysteine act as inhibitors in the metabolism of copper. They also demonstrated that ACTH preparations which were possibly contaminated, had a copper mobilising effect from the liver to the blood ; while cortisone possessed no such effect. Lerner (1959) studied the copper content of serum, excretion of 17-ketosteroids and noradrenaline, liver function tests, BMR, PBI_{131}, gastric analysis, skin temperature and sweat measurement of a large number of patients in each group. Out of 12 patients studied for copper content in serum, only one had a low copper content while the other had normal copper levels. He postulated that vitiligo may result from increased output of an agent like melatonin at peripheral nerve endings in the skin, that lightens the colour of pigment cells and decreases new melanin formation. Pinkus (1959) is of the opinion that vitiligo is an acquired progressive achromia due to loss of function of tyrosinase system of melanocytes at the epidermodermal junction. Behl, *et al.* (1961) studied 374 cases of vitiligo and investigated them from nutritional, endocrinal and neurogenic angles. No definite deviation was found except in serum and skin copper levels.

Keeping all these facts in view the authors proceeded with the investigation of copper levels of serum and skin of normal persons and those affected with vitiligo.

Materials and Methods

Five to six ml. of blood was collected from the medial cubital vein by introducing 20 gauge needle. Blood specimen was collected directly after allowing the specimen to stand for 3 to 4 into a sterile test tube which could be centrifuged hours. The serum thus separated was used for

analysis. Even slightly haemolysed specimens were rejected.

For the removal of skin, a suitable area from the affected and pigmented skin was washed with 35 per cent alcohol and allowed to dry. Three ml. of 1 per cent procaine hydrochloride was injected locally. After 10 to 15 minutes Thiersch graft was removed with a fine sterile razor blade, and immersed immediately into normal saline to get rid of blood cells. Another washing was given quickly and the skin was covered with Whatman filter paper No. 1 in order to absorb the maximum quantity of moisture. It was further dried in an electric oven at 110°C for 12 hours to attain constant weight. It was weighed and digested with 2 ml. H_2SO_4 (A.R.) and a few drops of H_2O_2 to a clear fluid which was diluted to a volume of 10 to 25 ml. (1 mg./ml.) depending upon the mass of the skin. This digest was further treated with sodium-diethyl thiocarbamate for colour production.

Method employed for the estimation of copper—On account of the availability of U.V. Hilger Spectrophotometer, Model" 700308, the method for assay employed was that of Gubler *et al.* (1953). This method gave good results at 450 mμ.

Results and Discussion

Serum—After standardising the method of copper estimation, a study was undertaken to probe into the copper level of serum and skin of normal and affected persons. The sera of 25 normal persons both male and female of varying ages, were employed.

The level of copper in normal subjects is given in Table 1 and the content was found to be 106±15 μg. per 100 ml. The results are in good agreement with those of earlier investigators quoted above. Copper content in the serum of 57 persons with vitiligo was found to be in the range of 69±9 μg/100 ml. (Table 2), and the level seems to be lower than normal. Lerner (*loc. cit.*) carried out analysis of 12 sera from persons affected with vitiligo and could find only one case where the value was low. However, there are many difficulties with regard to the collection of blood and with a slight haemolysis copper of the RBC may be reflected in the serum. Six normal persons were found to have higher values than the mean. Similarly the values were found higher than normal in 16 vitiligo patients.

Skin—Anwar El-Mofty *et al.* (*loc. cit.*) have used hydrochloric acid for hydrolysis and release of copper, trichloracetic acid for precipitation of proteins from liver homogenates. In our series of skin studies, the tissue was digested with sulphuric acid (A.R.) and hydrogen peroxide and further processed for analysis. The values in 24 normal persons, are given in Table 3, and are on an average 66±15 μg/100 mg. dried skin.

The results of further study on the skin pieces of 52 patients, both normally pigmented and vitiligenous are presented in Table 4.

It will be seen that normal skin has a copper content of 65±8 μg/100 mg. and the affected skin has 26±5 μg/100 mg. dry weight. It seems likely that the copper metabolism is affected in these areas of the skin. A further support to this view is given by Behl *et al.* (*loc. cit.*) that the depigmentation of the skin could be arrested in a large percentage of cases by administering copper salts in the form of cupric chloride, etc., orally or intravenously.

Table 1—Showing Normal Serum Copper Content

Name	Age (years)	Sex	Copper content (μg/100 ml.)
K.L.	36	M	65
H.S.	13	M	66
M.D.	32	F	74
H.L.	40	M	82
S.D.	28	F	95
R.S.A.	25	M	82
R.P.	14	M	79
D.S.	28	M	66
B.R.	27	M	58
P.V.	40	F	50
R.D.	32	M	66
G.P.	30	M	260
R.S.	26	M	282
D.C.	24	M	262
R.D.	18	M	180
M.R.	38	M	170
H.R.	18	M	45
H.M.	32	M	45
S.R.	40	M	44
R.U.	12	F	40
K.S.	22	F	40
S.D.	30	M	40
N.C.	12	F	222
S.	12	F	111
R.S.	40	M	160

Mean ± S.D. = 106 ± 15 μg/100 ml.

TABLE 2—SHOWING SERUM COPPER CONTENT OF AFFECTED PERSONS

Name	Age (years)	Sex	Copper content (μg/100 ml.)
S.M. ...	16	M	50
R.S. ...	24	M	82
S.K. ...	12	M	102
R.K. ...	26	M	40
A.K. ...	16	M	20
K.N.S. ...	16	M	53
S. ...	14	M	41
R.K. ...	10	M	55
S.P. ...	14	M	66
S.B. ...	18	F	60
C.L. ...	26	M	180
S.D. ...	30	M	90
G.S. ...	16	M	80
G.K. ...	6	F	18
S. ...	32	F	69
K.K. ...	22	F	70
D.N. ...	19	F	40
S.D. ...	19	M	6
D.P. ...	21	M	2
D.C. ...	22	M	31
S.K. ...	24	F	20
R.P. ...	30	M	50
P.A. ...	17	F	28
R. ...	36	F	25
C.L. ...	22	M	105
J. ...	18	M	105
R.B. ...	16	M	15
B. ...	18	M	35
P.S. ...	25	M	120
C.M. ...	18	M	80
S.V. ...	18	M	36
M.C. ...	9	F	150
C.K. ...	16	F	120
S.P. ...	26	M	19
D.S. ...	24	M	46
N. ...	19	F	30
H.S. ...	18	M	40
S.K. ...	4	M	82
P.S. ...	25	M	76
R.K. ...	28	M	54
K. ...	18	F	25
S.K. ...	21	F	25
K. ...	16	F	125
R.R. ...	36	F	60
B. ...	12	F	150
S.N. ...	15	M	48
B. ...	26	F	100
P.H. ...	45	M	80
E.S.R. ...	25	M	170
S.M. ...	18	M	170
M.C. ...	30	M	160
A.K.D. ...	40	M	60
B.R. ...	32	F	55
S.N. ...	22	M	150
B.C.V. ...	26	M	150
S. ...	13	M	100

Mean ± S.D. = 69 ± 9 μg/100 ml.

TABLE 3—SHOWING COPPER CONTENT OF SKIN OF NORMAL HEALTHY INDIVIDUALS

Name	Age (years)	Sex	Copper content (μg/100 mg.)
D. ...	20	F	15
S.S. ...	17	M	4
K.R. ...	26	M	28
V.D. ...	30	F	6
O.P. ...	20	M	10
C.L. ...	25	M	45
P.N. ...	18	M	31
A.N. ...	28	M	23
S.B. ...	8	F	15
M.N. ...	22	M	12
S.K. ...	20	F	60
G.D. ...	18	M	66
J. ...	18	M	18
K.D. ...	32	M	120
K.D. ...	28	M	110
R.K. ...	26	M	270
P.L. ...	30	M	180
S. ...	17	M	190
A.B. ...	16	M	18
C.K. ...	19	M	20

Mean ± S.D. = 66 ± 15 μg./100 mg.

SUMMARY

1. The copper level (total ionic and protein bound) in serum in 13 healthy persons was found to be 106 ± 15 μg/100 ml.

2. Of 29 persons affected with vitiligo, 60 per cent showed low values of serum copper, the mean was 69 ± 9 μg/100 ml.

3. Normal skin copper level was found to be 65 ± 8 μg/100 mg. dry weight and copper level in vitiligenous skin was in the range of 26 ± 5 μg/100 mg. dry weight.

4. In the vitiligo skin, the level of copper which may be responsible for the various enzymic reactions in the melanin formation, and in turn alters the colour of the skin, was found to be decreased.

ACKNOWLEDGMENTS

The authors are grateful to Col. B. L. Taneja, Principal, Maulana Azad Medical College and Superintendent, Irwin Hospital, New Delhi, for his encouragement and keen interest in this investigation. The authors are also thankful to Shri Vinod Kumar (technician) for his assistance in this study.

One of us (R.S.A.) is thankful to the Unichem for the award of fellowship.

TABLE 4—SHOWING COPPER CONTENT (μG./100 MG.) OF PIGMENTED AND DEPIGMENTED SKIN OF AFFECTED PERSONS

Name	Age (years)	Sex	Copper content of skin	
			Pigmented	Depigmented
S. ...	13	F	37	17
K.K. ...	22	F	75	375
G.K. ...	6	F	35	0·5
R.B. ...	27	M	9	1
C.L. ...	22	M	8	4
P.J. ...	11	F	110	50
C.P. ...	14	M	75	120
R.K. ...	30	F	21	17
R.K. ...	25	M	26	20
S.P. ...	20	M	20	20
S.L. ...	25	F	18	12
K. ...	12	F	50	20
M.C. ...	11	F	72	70
K. ...	20	F	3·5	0
S.N. ...	22	M	21	2
S.B. ...	18	M	62	0
P.S. ...	25	M	60	20
E.S.E. ...	24	M	160	55
S.M. ...	16	M	65	39
B. ...	18	M	90	40
R.C.V. ...	26	M	100	100
B. ...	7	F	24	2
M. ...	8	F	200	69
K.L. ...	18	F	50	18
C.L. ...	22	M	140	70
P.S.B. ...	25	M	0	0
D. ...	32	F	10·2	3
D. ...	28	F	2	1
S.S. ...	22	F	52	30
S.K. ...	13	M	38	0
C.K. ...	18	F	13	3
D.S. ...	18	M	7·5	4
P.S. ...	25	M	60	20
S.B. ...	18	F	20	5
H.S. ...	16	M	23	18
N. ...	19	F	100	20
R.S. ...	22	M	96	48
R.K. ...	26	M	17	12
R.B. ...	27	F	210	12
M.M. ...	26	F	10	72
M. ...	8	F	40	0
T.H. ...	38	M	60	0
H.C. ...	40	M	10	20
A.K.D. ...	40	M	45	0
R.P. ...	30	M	80	35
R.S.K. ...	45	F	60	150
S. ...	32	F	8	30
S.D. ...	12	M	150	2
B.L. ...	30	F	200	0
V.W. ...	45	M	150	120
S.S. ...	18	M	100	0
J.R. ...	18	M	150	0
			Mean ± S.D. = 65 ± 8 μg. /100 mg.	Mean ± S.D. = 26 ± 5 μg. /100 mg.

REFERENCES

ANWAR EL-MOFTY, ABDEL MONEM EL-MEFTY, HASSAN ABDELAL AND EL-HAWARY, M. F. S.—*J. Invest. Dermat.*, **32**: 645, 1959.

BEHL, P. N., AGARWALL, R. S. AND GURDAS SINGH—*In press.*

CARTWRIGHT, G.—Cited in Symposium on Copper Metabolism (Ed: McElroy, M. D. and Glass, B.), 1950, The John Hopkins Press, Baltimore.

CARTWRIGHT, G. E., HODGES, R. E., GUBLER, C. J., MAHONEY, J. B., WINTROBE, M. M. AND BEAN, W. D.—*J. Clin. Invest.*, **33**: 1487, 1954.

CUMMING, J. N., GOODWIN, H. J. AND EARL, C. J.—*Ibid.*, **8**: 69, 1955.

DAWSON, C. R. AND MALLETTE, M. F.—*Advances in Protein Chemistry*, **2**: 179, 1945.

DAWSON, C. R. AND TARPLEY, W. B.—The Enzymes, Vol. 2, 1951, Academic Press, New York, p. 459.

FITZPATRICK, T. B. AND SZABO, G.—*J. Invest. Dermat.*, **32**: 197, 1959.

GUBLER, C. J., LAHEY, M. E., APHENBRUCKER, H., CARTWRIGHT, G. E. AND WINTROBE, M. M.—*J. Biol. Chem.*, **196**: 209, 1952.

HOLMBERG, C. G. AND LAURELL, C. B.—*Acta. Chem. scandinav.*, **2**: 550, 1948.

Idem—Ibid., **5**: 476, 1951.

LAHEY, M. E., GUBLER, C. J., CARTWRIGHT, G. E. AND WINTROBE, M. M.—*J. Clin. Invest.*, **32**: 329, 1953.

LERNER, A. B. AND CASE, J. D.—*J. Invest. Dermat.*, **32**: 211, 1959.

LERNER, A. B.—*Ibid.*, **32**: 285, 1959.

MANN, T. AND KELLIN, D.—*Proc. Roy. Soc., s. B*, **126**: 303, 1938.

NELSON, I. M. AND DAWSON, C. R.—*Advances in Enzymology*, **4**: 99, 1944.

PATHAK, M. A. AND FATZPATRICK, T. B.—*J. Invest. Dermat*, **32**: 509, 1959.

PINKUS, H.—*Ibid.*, **32**: 281, 1959.

THOMPSON, R. H. S. AND WATSON, D.—*J. Clin. Path.*, **2**: 193, 1949.

VALEE, B. L.—*Metabolism*, **1**: 420, 1952.

SPECIAL ARTICLES

TISSUE CULTURE IN THE DIAGNOSIS OF VIRUS DISEASES

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Tissue culture, one of the marvels of modern biological sciences, an imitation of nature in the laboratory, can be termed as 'test-tube babies' in layman's terms. Though tissue culture was primarily started and much developed by the anatomists for the study of morphogenesis, origin

of different cell layers, organogany and experimental embryology, it has taken long strides to find its place in the major fields of investigation of medicine, cell physiology, cell pathology, bacteriology, immunology, oncology and virology. A few landmarks in the application of tissue culture to virology are traced.

Harrison (1907) developed plasma hanging drop technique. Steinhardt *et al.* (1913) cultivated vaccinia virus in hanging drop cultures. Rous and Jones (1916) described a method of obtaining suspensions of living cells from 'fixed cells'. Parker and Nye (1925) used living tissues for growing viruses. The work of Carrel and others in the preparation of flask cultures is well described by Parker (1950) in a monograph. Maitland (1928) showed that vaccinia virus could be grown in suspended cell culture of chicken kidney. Robbins and Enders (1950) have reviewed tissue culture studies in relation to morphological development, prophylactic agents, interference phenomenon, and chemotherapeutic agents of viruses. They have also mentioned the conditions affecting the rate of growth of viruses in tissues.

The impetus given by the National Foundation for Infantile paralysis under polio studies, and the National Institutes of Health and Cancer Research in America afforded wonderful opportunities for further development of tissue culture in relation to virus studies since 1950. The finding of a basal synthetic medium 199 by Morgan *et al.* (1951) containing optimal concentrations of nineteen aminoacids, glutamine, vitamins A, D, E, K and B group, biotin, folic acid, cholesterol, purines, pyramidines, ribose, deoxyribose, adenylic acid, adenosine triphosphate, ferric nitrate and other constituents which can support life for five to six weeks, and the development of dispersed monolayer cell cultures on glass by Dulbecco and Vogt (1954) are two notable advances. At the present time the dispersed monolayer cell culture technique with monkey kidney cells in small screw-capped test tubes is largely employed for growing viruses in tissue culture and identifying them using immunological methods. Finally the use of antibiotics in preventing secondary contamination by bacteria, has given an added stimulus for tissue culture work in recent times.

The object of the present article is to aid the physician to visualise the actual procedures involved and to give an outline of methods employed in the use of tissue culture as a diagnostic tool. A discussion is also given based on the author's practical experience gained during his study tour in U.S.A. on a fellowship programme sponsored by the Technical Cooperation Mission.

Materials and Methods

The earlier techniques of fragmented tissue, suspended tissue culture techniques mentioned in the introduction are supplanted by the monolayer cells culture in tubes for all diagnostic tissue culture work. This method alone is described in the following pages. There are four essential steps in investigating diseases by tissue culture technique. The first step is the growth of the cell lines in tubes and their maintenance ; second, proper collection of clinical material and inoculation into the tissue culture tubes ; third, detection of the virus by cytopathogenic changes and its isolation ; and fourth, identification and typing by either tissue culture or other serological and animal inoculation methods.

Step I, Cell lines—The most frequently used cells are the monkey kidney, HeLa strain of human epidermoid carcinoma, human amnion, and F.L cells. The idea in using different cell lines is maily due to their variation in susceptibility to different viruses, and also because it would be advantageous to use types of tissue which are most susceptible to infection by the different viruses and capable of showing cytopathogenic effects. The HeLa and F.L cells have the added advantage that these cells are readily cultivable by transplant and thus permit maintenance of tissue source from which cultures can be prepared as required without recourse to fresh supply of monkeys or fresh human placentas.

The preparation of trypsinised monkey kidney cells and their growth into monolayer tissue cultures are done by using procedures laid down by Bodian (1956). The methods involved the dissection of kidneys aseptically from anaesthetised monkeys (Rhesus or Cynomolgus) and selecting the cortical material which is then finely cut into pieces. These pieces are suspended in buffered trypsinised saline and kept in the cold room at 0° to 4°C and stirred by a mechanical magnetic stirrer. The cells get seperated from the tissue by this mechanical action and the enzymic action of trypsin on intercellular matrix. The eluted cells and fluid are centrifuged and the cells are separated, washed free from trypsin and resuspended in the growth medium to standard strength which is determined by haemocytometer. The standardised suspension in growth medium is distributed into rubber stoppered test tubes (16 × 150 mm. size) in small 1 ml. volumes using Cornwall automatic pipetting unit. These test tubes are incubated in a stationary position at a slight tilt from horizontal for six or seven days. At the end of this period the zone of confluent kidney epithelium covers the glass surface of tube in contact with

the cell suspension. Large cultures can also be prepared in Roux bottles if desired for antigen preparation or culture maintenance in the laboratory. The monolayer culture tubes are used for routine inoculation of clinical material for isolation of viruses. The growth medium used in the tube consists usually of the synthetic mixture, 2·8 per cent $NaHCO_3$ and 2 per cent horse serum. Bodian uses lactalbumin hydrolysate, glutamine, d-l valine, glucose with Hank's solution, calf serum and $NaHCO_3$ to give a final pH of 7·4 to 7·6.

HeLa cells are prepared according to Syverton and colleagues (1954) who found that Gey's HeLa strain of human epithelial cells originally derived from carcinomatous tissue of the cervix supports growth of poliovirus. A growth medium for HeLa cells contains usually Hank's solution, glucose, tryptone and yeast extract. The cells can be transferred in suspension from one batch to another and a continuous supply can be maintained in the laboratory. They stick to glass surfaces and sufficient monolayer culture is formed in five to ten days. Cytopathogenic change is quite rapid and occurs in 24 to 72 hours. The HeLa cells can be commercially purchased (in U.S.A.) or obtained from another laboratory in the frozen condition and can be propagated continuously. Tube cultures of HeLa cells are maintained as in the case of monkey kidney cells.

Human amnion cells could be prepared starting from fresh human placenta. The methods recommended by Cohen and Roz (1956) may be used. The latter method is simple. Fresh human placentas from Caesarean or normal uncomplicated deliveries are obtained under aseptic precautions. The amnion is separated from chorion by blunt dissection with forceps. The cleared amnion is trypsinised, cells released, washed and resuspended in a growth fluid containing Eagles medium, yeast extract, glucose and 20 per cent inactivated pooled human serum. Cell sheets appear in 24 hours. For maintenance of cells after sheets have formed and for virus cultivation a medium containing Hanks balanced salt solution, glucose, lactalbumin hydrolysate, glutamine, valine and 2 per cent calf serum is used.

F.L. cells are also being used largely for their easy cultivation, and maintenance in the laboratory. Fogh and Lund (1957) while working in virus laboratories at Albany have successfully developed continuous cell line upto 154 transfers (till the date of report) of F.L. cells which was originally started with human amnion cells. They use a growth medium called L.Y. medium consisting of Earl's balanced salt solution, lactalbumin hydrolysate, yeast extract, dextrose and 20 per cent pooled human or animal serum. Versene (Disodium versenate) is used to dislodge the cells from glass when transfer is required for fresh growth. The human amnion and F.L. cells are also prepared in monolayer culture tubes, as in the case of monkey kidney (M.K.) cells.

Step II, Clinical material—The second step is the collection of clinical material. Whilst tissue culture is employed for isolation of certain viruses, all virus diseases cannot be diagnosed by this method. It is limited to about eight diseases as charted out in Table 1. The material that is collected for virus isolation mainly depends on the presence of virus during the particular stage of the disease. While stool could be used uniformly in the case of entero-viruses (Polio, Echo, and Coxsackie) for diagnosis, throat washings have to be used in acute diseases like influenza, herpes and measles. Vesicle fluid and scrapings of rashes have been used with success in herpes. Post-mortem materials from lungs and brain or cord tissue are used in influenza and polio respectively. It is also important to collect the material at the proper stage of the disease. Mostly the acute phase would be suitable, for virus isolation, though in convalescent stages also, polio and Coxsackie viruses are isolated. Attention should also be paid for proper storage and transport of material. It should be collected in a sterile glass container and stored in a frozen condition at 10° to 20°C either on dry ice (solid CO_2) or in mechanically operated freezers. During transportation the container should be kept packed in dry ice which is properly insulated from exposure to heat. Where long distances are involved, quick air transport to the place of the laboratory is the method of choice. If facilities for dry ice are not available, 50 per cent of glycerol (pure, high quality and neutral) in a solution of buffered saline (pH 7·4) can be used. Attention to all these details are essential to keep the viability of the virus material till it reaches the laboratory and is inoculated in tissue culture.

When throat swabs are collected from a case of influenza or herpes, or measles or polio it is better kept moistend with tissue culture fluid or sterile skimmed milk. When specimens are received in the laboratory they are thawed rapidly and centrifuged lightly. To the supernatant liquid antibiotics are added to a strength of 1,000 units of penicillin and 1,000 mcg. of streptomycin per ml. 0·2 ml. of this liquid is inoculated into each of the two tubes of tissue culture prepared as above.

In the case of stool (Daldorf and Sickles, 1956) a 20 per cent emulsion is prepared in normal

saline or nutrient broth by mixing well in a bottle containing glass beads (sterilised). This is centrifuged to remove the coarse suspensions and to the supernantant fluid antibiotics are added and used for inoculation into tissue culture tubes.

The post-mortem material is ground in a sterile sand in skimmed milk, centrifuged, antibiotics added, and inoculated into tissue culture tubes.

Step III, Virus isolation—As stated already the antibiotic treated material in 0 2 ml. volumes, is inoculated into two tissue culture tubes. Besides the undiluted sample, further dilutions of the material (10^{-1}, 10^{-2}, 10^{-3}) may also be employed for inoculation of tubes. One or more cell lines (Table 1) may be used with each dilution depending on the facilities available and thereby increasing the chances of isolation. All inoculated tubes are incubated at 35°C. Concurrently with tissue culture inoculation, the prepared clinical material is also inoculated into thioglycollate broth and blood agar plates and incubated for exclusion of possible bacterial contamination. In the tissue culture rack, two uninoculated tubes are left as controls from the same batch of tubes. The controls will guide us as whether any tissue changes have occurred in the inoculated tubes or not by comparision. They will also indicate whether any contamination has occurred in the original tubes.

The tubes are examined under low power objective of the microscope once a day. It is a well established fact that neither the viruses can be seen by the ordinary microscope nor can they multiply in the absence of live cells. Though the virus multiplication cannot be seen, its indirect effects of multiplication causing damage to the cells can be seen under the microscope. This damage is called cytopathogenic effect (C.P.E.) on the cell and if found, is a very potent observation for a positive detection of virus

TABLE 1—VIRUS ISOLATION BY TISSUE CULTURE FROM CLINICAL MATERIALS

S. No.	Disease	Stage	Specimen for culture	Postmortem material	Tissue cell line for isolation of virus	Detection by	Identification and serological typing
1.	Influenza A, B, C	First 3 days of disease—acute phase	Throat washing in neutralised skimmed milk	Lung tissue	M. K.	Cytopathogenic effect	Haemagglutination inhibition test on isolated culture
2.	Herpes	Acute stage	Throat washing, stomatitis lesions, fluid from vesicles	—	M. K., H. A., heLa, F. L.	—do—	Tissue culture neutralisation or in mice
3.	Measles	Acute stage within 1st day	Sputum, nasal mucosa	—	M. K. or H. A.	—do—	Neutralisation in tissue culture
4.	Poliomyelitis (1, 2, 3 types)	Acute or convalescent	Stool, throat washings (spinal fluid)	Brain or spinal cord	M. K., heLa	—do—	Neutralisation in tissue culture
5.	Echo 20 types	—do—	Stool (C.S.F.)	—	—do—	—do—	Neutralisation in tissue not pathogenic to mice
6.	Coxsackie virus—A-25 types, B-5 types	—do—	Stool (C.S.F.)	—	—do—	—do—	Neutralisation in tissue culture or in baby mice
7.	Adenovirus (ARD)	Acute stage	Throat washing or conjunctival swab	—	M. K., or heLa or H. A. or F. L.	—do—	Neutralisation in tissue culture
8.	Haemadsorbtion virus	—do—	Throat washing	—			Neutralisation in tissue culture

(C.S.F.) = Isolation from C.S.F. doubtful, M.K. = Monkey kidney cells, H.A. = Human amnion, F.L. = Fogh and Lund cells.

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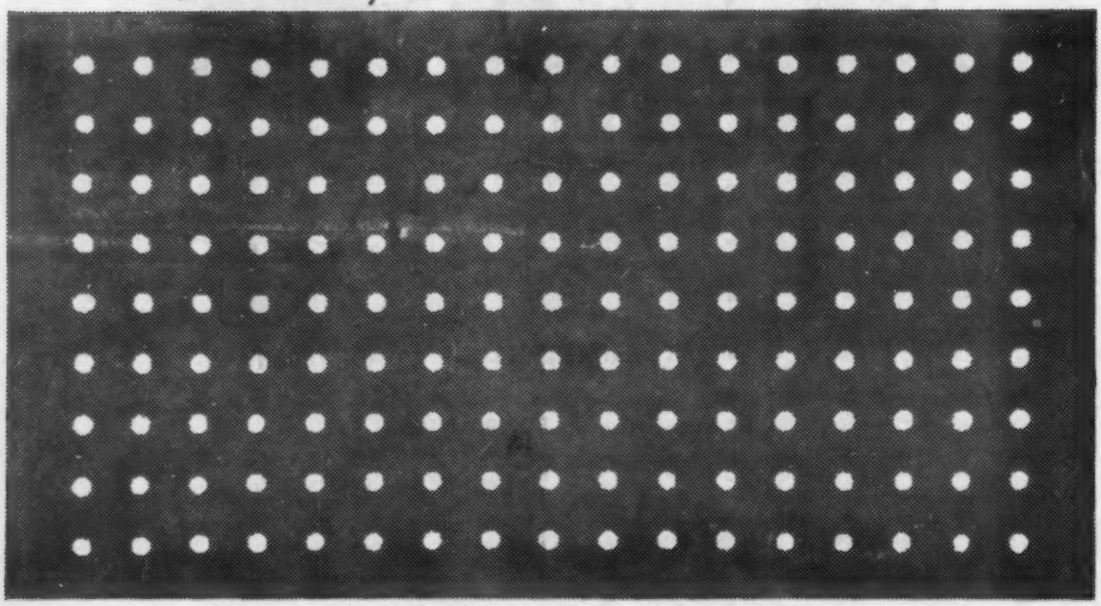

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growth. The cytopathogenic changes are recorded according as,

0 = No change in cells.
1+ = Early degeneration, rounding, swelling and separation from glass.
2+ = Further degeneration with loss of intercellular bridges, swelling, shrinkage and distortion, nuclear changes of pyknosis, karyorrhexis.
3+ = A complete lysis with the presence of an occasional cell.

The tubes are kept under observation for two weeks before declaring as negative for virus growth. At the end of this time one more 'blind passage' is attempted in the case of negative cultures. In positive cases at the height of the cytopathogenic effect (C.P.E.), usually after 7 to 10 days, the tissue culture material is harvested by pooling from all tubes and storing them in frozen condition until final identification is done by serological tests.

Step IV, Virus identification—The harvested material is identified finally as to its immunologic type by employing hyperimmune animal sera or human sera (convalescent) representative of various known types of sera for that particular infection. Tests of neutralisation of this unknown material is done either in tissue culture tubes or in susceptible animals. If the material contains a haemagglutinating agent, a haemagglutination inhibition test with immune ferret's serum is done. Table 1, column 8 shows the nature of tests required in each case of the unknown virus isolation for the purpose of typing.

Neutralisation tests—First the $TCID_{50}$, that is the 50 per cent tissue culture infective dose of the material is determined by titration of the unknown virus by preparing 10-fold serial dilutions using nutrient broth as diluent and inoculating into tissue culture tubes. 100 times the TCID dose is used for neutralisation test. This dose is mixed with the hyperimmune serum in equal quantity (usually 1/5 dilution of serum used). It is left at room temperature for one hour and at the end of this period the mixture is injected into two tissue culture tubes. Like this several sera can be tested against the unknown virus for neutralisation. At the same time a control infectivity test is also done in parallel by inoculating different dilutions of pure virus harvest into tissue culture tubes. The tissue culture tubes are incubated at 37°C and examined under the microscope daily for a week. If the virus is neutralised, no C.P.E. will be seen in the tubes containing virus serum mixtures compared to the control tubes with virus alone which will show the marked C.P.E. The same test can also be carried out in susceptible animals, with the difference that the virus serum mixtures are injected into the animals instead of tubes. If the virus is neutralised by the homologous serum, the animals will survive, otherwise they die. The type of the unknown virus then corresponds to the type of homologous immune serum which it neutralises.

The neutralisation phenomenon can also be used as the pH colour test for typing the unknown virus. Here the (convalescent or) immune serum is diluted to 1:4 and 1:8. This is then challenged with a known quantity of the virus (100 $TCID_{50}$) and then a 1 per cent suspension of monkey cells in a nutrient medium containing phenol red as pH indicator is added. After one week, normal cells (in a control tube) which have been metabolising will change the colour of the phenol red indicator from initial red to yellow. Killed cells will remain red, since the monkey cells have been killed by the virus. The end point of the serum also can be determined, where its highest dilution shows yellow colour. These various neutralisation tests have been extensively used in polio and coxsackie virus isolations from stool. It is also possible to do primary isolation of the virus of the coxsackie group using injection of prepared faecal suspension directly into baby mice (suckling, one-day-old). The ground emulsion of their harvested brains and leg muscels as a source of virus can be mixed with hyperimmune sera (from hamsters) and injected into a fresh batch of baby mice to see the effects of neutralisation.

Plaque technique—A further advance over the tissue culture in tubes is the plaque technique in petri dishes or flat corked prescription bottles, which has been developed by many authors (Dulbecco and Vogt, *loc cit.*; Fogh and Lund, *loc. cit.*). The principle of this technique is, after the tissue monolayer has grown on a flat glass surface of petridish or flat bottle, it is inoculated and overlaid with a layer of melted agar in the nutrient fluid. The agar solidifies and after incubation of the bottle for 24 to 48 hours, small plaques can be seen as brilliant, round, uncoloured areas contrasted with the red colour of the surrounding living cells stained with neutral red. The plaque areas are almost the single particles of virus destroying the cells in that area. These plaques though at first microscopic (can be seen with low power objective) become progressively increased in size. After 3 or 4 days, they can be visualised by the naked eye. The plaque technique is playing an important role in

the mammalian virus research, for virus assay and for cultivation of single cell clones (Puck and Marcus, 1955 ; Puck *et al.*, 1955).

Discussion

Many minute details regarding apparatus, quantification, media preparation, etc., connected with the practical working of tissue culture have been deliberately omitted for purposes of simplicity and brevity. Recourse could be had to such references on media mentioned in the text and also to a chapter by Melnick (1956).

It may further be mentioned here that other methods of staining of tissues from tissue culture and fluorescent antibody technique (Coons and Kaplan, 1959 ; Weller and Coons, 1954) also aid in the identification of viruses where such facilities are available. A complement fixation test (Ramana Rao, 1960) with isolated virus material as antigen and a known immune serum could also be used for identification.

Regarding cell lines for isolation, monkey kidney cells are uniformly good but it is quite expensive to obtain live animals for daily routine. Simple procedures utilising human amnion cells from fresh placenta, a waste product of maternity wards, could be used. Also HeLa or F.L cells when once obtained from a foreign source in frozen state can be maintained in the laboratory by transfer. Although the tissue culture methods for isolation are described in simple terms here, in practice they are laborious, time consuming and costly for routine diagnostic work. Where a choice exists between isolation and serology for virus diagnosis, the latter should be chosen for its simplicity and inexpensiveness.

Isolation procedures have a limited field in their application under the following conditions.

1. Diagnosis in a hitherto unknown disease.
2. For epidemiological and public health work.
3. Differential diagnosis between certain types like herpes simplex and zoster.
4. As a research problem.

Fallacies of bacterial contamination, nonspecific degeneration of tissue due to toxic substances in nutrient fluid or inoculum, foamy agent, etc., have to be borne in mind. Utmost care in collection, storage, and preperation of clinical material, observance of aseptic technique at all stages, attention to details and mastering of techniques of work are essential for success.

It should also be emphasised that mere isolation of a virus from the throat or faeces of a person does not establish the disease. A clinical and epidemiological correlation is necessary for a proper appraisal and establishment of correct diagnosis.

Summary

1. Developments in tissue culture are reviewed.

2. An outline of the methods of tissue culture techniques are described in four steps :

i) Growth of cell lines and maintenance.
ii) Collection of clinical material and inoculation for isolation of virus.
iii) Detection and isolation of virus by cytopathogenic effects.
iv) Identification by tissue culture neutralisation and other serological tests.

3. Illustrations of cytopathogenic effects which form a window for visualisation are described in detail.

4. Relative merits of the use of tissue culture for routine diagnostic work are discussed.

Acknowledgments

I acknowledge with grateful thanks the help and cooperation of the staff of the virus laboratories of the Division of Laboratories and Research, New York State Department of Health, Albany, N.Y. (U.S.A.). I am indebted to the T.C.M./I.C.A. authorities of U.S.A. for giving me an opportunity to participate in their fellowship programme.

References

Bodian, D.—*Virology*, **2** : 575, 1956.

Cohen, S. M. and Roz, A.—Preparation of human amnion tissue culture, 1956—Annual report of Division of Laboratories and Research, New York State Department of Health, p. 45.

Coons, A. H. and Kaplan, M. H.—*J. Exper. Med.*, **91** : 1, 1950.

Daldorf, G. and Sickles, G. M.—The Coxsackie Viruses in Diagnostic Procedures for Virus and Rickettsial Diseases, American Public Health Association, New York, Ed. 2, 1956, p. 153.

Dulbecco, R. and Vogt, M.—*J. Exper. Med.*, **99** : 167, 1954.

Fogh, J. F. and Lund, R. O.—*Proc. Soc. Exper. Biol. Med.*, **94** : 532, 1957.

Harrison, R. G.—*Proc. Soc. Exper. Biol. Med.*, **4** : 140, 1907.

Maitland, H. B. and Maitland, M. C.—*Lancet*, **2** : 596, 1928.

Melnick, J. L.—Tissue Culture Methods for Cultivation of Poliomyelitis and other Viruses in 'Diagnostic Procedures for Virus and Rickettsial Diseases', American Public Health Association, New York. Ed. 2, 1956, p. 97.

Morgan, J. F., Morton, H. J. and Parker, R. C.—*Proc. Soc. Exper. Biol. Med.*, **73** : 1, 1950.

PARKER, F. AND NYE, R. N.—*Am. J. Path.*, **1** : 325, 1925.
PARKER, R. C.—Methods of Tissue Culture, Ed. 2, P. B. Hoeber Inc., New York.
PUCK, T. T. AND MARCUS, P. I.—*Proc. Nat. Acd. Sc.* (U.S.A.), **41** : 432, 437, 1955.
PUCK, T. T., MARCUS, P. I. AND CIECIURA, S. J.—*J. Exper. Med.*, **103** : 273, 1955.
RAMANA RAO, P. V.—*Indian J. M. Sc.*, **14** : 8, 1960.
ROBBINS, F. C. AND ENDERS, J. F.—*Am. J.M.Sc.*, **220** : 316, 1950.
ROUS, P. AND JONES, F. S.—*J. Exper. Med.*, **23** : 549, 1916.
STEINHARDT, E., ISRAELI, C. AND LAMBERT, R. A.—*J. Infect. Dis.*, **13** : 294, 1913.
SYVERTON, J. T., SCHERER, W. F. AND ELWOOD, P. M.—*J. Lab. Clin. Med.*, **43** : 286, 1954.
WELLER, T. H. AND COONS, A. H.—*Proc. Soc. Exper. Biol. Med.*, **86** : 789, 1954.

A METHOD FOR THE DETECTION OF DIAZINON IN VISCERA

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INTRODUCTION

Diazinon, 0, 0-diethyl-0-(2-isopropyl-6-methyl-6-methyl-4-pyrimidinyl) thiophosphate, is an organophosphorous insecticide, effectively used in agriculture. In the household it is used for killing bed-bugs, moths and like insects. Hence, it finds a good sale in the market. The toxicity of diazinon, estimated by LD_{50} values for rats is approximately between 220-270 mg. per kg. body weight (Metcalf, 1955). Owing to the acute toxicity of organophosphorous compounds they are used with suicidal or homicidal intent. Within recent years a large number of cases of poisoning by these compounds, some being attributed to diazinon, have been noticed. Therefore, the methods employed for detection of diazinon even in microquantities pose a problem of toxicological and forensic importance.

The methods in use are many and some of them involve spectrophotometry whilst others chromatography. In many of these the basic technique, as evolved by Harris (1953) of Geigy, namely isolation of the active substance from the reaction solution, its hydrolysis by use of alcoholic solution of potassium hydroxide and the study of its absorption spectrum in the ultra-violet range, with the help of a spectrophotometer, was adopted. In a modification of this procedure Blinn and Gunther (1955) hydrolyse diazinon to 2-isopropyl-6-methyl-4-pyrimidinol and isolate the pyrimidinol from the weakly acidified solution by extraction with carbon-tetrachloride and determine its light absorption at 272 millimicrons. As an alternative, Fallscheer and Cook (1956) brominate the active substance to *in vitro* inhibitors before further study. In chromatographic analysis of residues, Müller, Ernst and Schoch (1957) develop the chromatogram with an alkaline alcoholic solution of fluorescein after exposure to bromine vapours and identify the yellow-white spots by outlining them under ultra-violet light. Vigne, Tabau, Chouteau and Fondarai (1957) employ a liquor ammonia-ethanol-water mixture in the proportion 1 : 3 : 5 for the separation of the active substance from the common impurities by chromatography and determine its activity due to phosphorus content. These are complicated and therefore a simple and effective method of detection of diazinon is desirable.

The coupling of the pyrimidinyl compounds with diazonium salts can be effective at the free 5-position when $-OH$ and $-NH_2$ groups are in the positions 4 and 6. When diazinon is treated with diazonium salt of p-nitroanilane in the presence of an alkali, a coloured product results.

A sensitive and simple method of detection of diazinon based on the above considerations is tried with fruitful results on application to the residues obtained from viscera.

EXPERIMENTAL METHOD

1. *Reagents* :

(i) p-nitroaniline solution 0·1 per cent in 0·1 N HCl.
(ii) Sodium nitrite solution 0·5 per cent in water.
(iii) Sodium hydroxide solution 0·1 per cent in water.

2. *Procedure* :

(a) The viscera are subjected to steam distillation after mincing and acidifying with tartaric acid. The distillate is collected in 100 ml. quantity and extracted twice with 25 ml. of light petroleum ether (B.P. 40°C—60°C) at each extraction. The petroleum ether extracts are pooled and evaporated at a low temperature (60°C). The residue is extracted twice with 5 ml.

and 3 ml. of ethyl alcohol and the volume is made up with the same to 10 ml.

(b) 10 ml. of p-nitroaniline solution is cooled to 0°C in a hard glass test tube under cracked ice and diazotised with the smallest quantity (about 0·5 ml.) of the sodium nitrite solution. Diazotisation is complete in about one minute and this is indicated when the yellow colour of the solution becomes colourless.

(c) 0·3 ml. of alcoholic solution of the sample extracted from the viscera under analysis is treated with 0·1 ml. of 0·1 N sodium hydroxide solution and well mixed. To this mixture 0·1 ml. of the diazonium salt of p-nitroaniline (prepared as above) is added, when an orange-red colour appears immediately. The entire procedure is conducted in cracked ice at 0°C. The colour obtained is observed to be stable for a reasonable period.

Summary

An extremely useful procedure is suggested as an alternative to spectrophotometric and chromatographic methods of detection of diazinon, which involve costly equipment and are time-consuming. Such a procedure is handy in all laboratories and the colour obtained is easily observed. The reaction is reasonably sensitive and makes it possible to detect 10 micrograms of diazinon. The reagents used are simple and commonly stocked in laboratories, but the importance of using freshly prepared analytically pure reagents, and observing the experimental conditions advocated are stressed. Organophosphate contained in Parathion (Folidol E. 605) does not give this colour reaction.

Acknowledgment

This work was done in the Laboratory of the Chemical Examiner to the Government of Mysore, Public Health Institute, Bangalore. The authors acknowledge their thanks to the Director of Public Health, Mysore, for encouragement and facilities rendered. Their thanks are also due to the valuable assistance of the staff of the laboratory.

References

Gunther, F. A. and Blinn, R. C.—Chemical Analysis, Vol. 6: Analysis of Insecticides and Acaricides, p. 113.

Blinn, R. C. and Gunther, F. A.—*J. Agri. Food Chem.*, **3**: 1013, 1955.

Fallscheer, H. O. and Cook, J. W.—*J. A. Off. Agri. Chemists*, **39**: 691, 1956.

Metcalf, R. L.—*Insecticides*, **6**: 305, 1955.

Müller, R., Ernst, G. and Schoch, H.—*Mitt. Gebiete Lebensm u. Hyg.*, **48**: 152, 1957.

Vigne, J. R., Tabau, R. L., Chouteau, J. and Fondarai, J.—UNESCO/NS/RIC/**99**: p. 16, 1957 (in French).

THE NEUROLOGY AND BIOCHEMISTRY OF RENASCENTISATION PHENOMENON IN SYMBOLOGY

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The phenomena of regression and progression, the latter working through from the regressed level to pre-attained sublimation level, are generally accepted by all workers in the field.

But certain workers do not accept regression to the very early months of infancy as worked out by M. Klein and to the foetal life as observed by the author, on the ground that the structural basis of adult memory processes have not begun to function by that period.

The author's difference with the findings of M. Klein is that her findings are based not only on what the infant feels in the early months of extra-uterine life for the first time, but what he had felt (as mere fantoms) from certain stages in intra-uterine life, now being reinterpreted by him in terms of the cradle-set as well as due to the psychophysical maturation of the endodermal functions. The basic process being the same as the conversion of the babel of the infant into word language of later childhood. But this has been studied elsewhere (Nand, a) and is mainly due to the author's study of the creative process and of development of moral values which Klien did not study.

Are the stages of psychological development in early life earlier than the stage when the infant or the child has developed the function of memory (as observed in the adult) renascentisable in the adult under certain circumstances, for example, in creative behaviour and moral conversion phenomena? What is the organic basis of this renascentisation?

Cameron (1947) refutes this renascentisation, partly because he has not heard the case of the defence in all its details. It is not the specific localised experiences and concrete memory of these early experiences which are suggested for acceptance but a renascentisation of general early infantile and foetal states, of the functioning patterns, architecture and constellation of the structural basis yet unstructured completely, which are the case in point in the argument. In fact for this paper, it may be stated that renascentisation in a limited sense means that the organic basis of biosocial behaviour of man under conditions mentioned above, under stress and strain

becomes or tends to become, to varying degree, unstructured, while in routine behaviour, it continues to remain structured. The destructuralisation is refoetalisation and restructuralisation is rebirth in symbology.

The degree of the unstructured state tolerable by various individuals vary and toleration is acquirable by graduated stress tolerance and strain tolerance in localised functional spheres. This renascentisation of unstructured patterns of the biological basis of biosocial behaviour, with the parallel psychic phenomena observed in creative behaviour, sublimation, individuation and moral development, is probably the main basis of the phylogenetic and ontogenetic phenomena which differentiate man from animals. Unless these psychological fields are studied psychodynamically the pressing observation of renascentisation and destructuralisation does not become as central in our conceptualisation as it deserves to be.

Bellak (1930) states, "The third and very serious criticism of Klein's ideas derives from the doubt that complex perception and integration such as she postulates for the third and sixth month of life can be accomplished by the neurophysiological apparatus of the infant. The most serious charge of all, of course, that careful and controlled observation and differentiation of observed facts and theory is even much more seriously disregarded by Kleinians than by other schools of psychoanalytic thought. Only careful experimental work will put the psychoanalytic house in order."

Under extraordinary stress or inner strain due to environmental or constitutional factors on the path of the maturation of the personality, the routine behaviour previously acquired is not able to meet the demands and the varying degree of adaptive and play behaviour which continued to occur in everyday life, is observed in greater fluctuations, creative behaviour may occur and the tension may be resolved (Nand, b). But if this does not occur, dysnoia or conflicts and tensions mount, dream-work or its equivalents come into play, error and trial or trial and error processes begin to function both in the creative state and in the moral conversion state as in dream-work. Gradually the set method prejudices ego-defences, ego-resistances and even ego-boundaries and ego-feelings break down and are remade. The organic basis in localised functional spheres is destructured or, in other words, the early destructured state of neonate and foetal reflexology is renascentised symbolically. Neogenesis in the molecular level occurs in various dimensions and restructuralisation of the new patterns, architecture and constellations may fit in the demands of the jig-saw puzzles and reco-ordination may be re-established.

These are the crux of the findings of the author's work (Nand, 1950) on total psychoanalysis and the main points in these findings are supported by many other workers.

The study of the organic basis of destructuralisation and restructuralisation as well as renascentisation of foetal patterns of the organic basis takes us to the study of cyto-ecology and cytodynamics and to the basic questions posed early in the paper.

It has been stated, "The lipids which preponderate in the lipid sheath are known to appear late in both senses ; myelin seen histologically appears in the brain appreciably later than does the commencement of electric activity."

Thus the statement of some workers that just because myelinisation has not begun at a certain age or before birth, therefore there was neither electric activity nor the still earlier biochemical and biophysical type of cyto-ecological function at the level of the primitive nervous system, is not to be given the importance, claimed by them. The time and level at which partial episodal and fluctuant pattern of activity due to primitive cytodynamic and cyto-ecological function before full mature activity may develop in extra-uterine or even in intra-uterine stages, has to be left open, from the organic standpoint.

It is not suggested that destructuralisation occurs at the tissue or gross histological level. It is suggested that it occurs at the level of enzyme microsome and plasmogene level of activity, the histological level remaining constant in both the phases of restructuralisation (rebirth) and destructuralisation (refoetalisation).

Other workers have pointed out that DNA molecule is associated with reticular formations in a cell while RNA is less bound down in the formation of reticular formations, due to its chemical constitution. The important role of RNA and viral *versus* adaptational plasmogene activity has already been studied to be the organic basis of play, adaptive and creative behaviour (Nand, c and d).

Lederberg (1960) has pointed out, "The chief difference in primary structure between DNA and RNA is the hydroxylation of C'_2 in the ribose, so that a reactive sugar hydroxyl is available in RNA. This may prove to be important *in the less ordered secondary structure of RNA* and in its function as an intermediary to protein . . . From this resumé we may observe that the DNA backbone constitutes an inert but rigid framework on which the differential nuclei are strung. Their special constraint lends specificity to the pattern

of hydrogen bonding exposed at each level. This extended pattern is a plausible basis for replication ; it is difficult to visualise any reagents besides other nucleotides to which this pattern would be relevant. These conditions are quite apt for a memory device—rubber and gun-cotton are poor choices for a computing tape."

Genetic recombination in bacteria (Lederberg, 1960) and the enzymic changes after the fertilisation of the ovum by the sperm are cases in point where structuralisation, destructuralisation and restructuralisation are occurring at the gene, microsome and chromosome levels frequently, without changing the gross histological appearances, directly.

Another group of workers states, "We are now in a position to look back at the situation as it was left by Darwin. To Darwin variation was what he saw in the members of a living species. He discovered the great problems of inbreeding and outbreeding, of adaptation and selection, but in terms of the variations he saw, these problems could not be solved. Now we realise that underlying the visible variation are organisations of genes and chromosomes, which exist largely as means of suppressing the appearance of variations. They contain the variability and reveal it in ways which the principles of Mendelism and Morganism enable us to understand. The operation of these principles is, of course, complex and in a sense abstract.

"But it is capable at every stage of being submitted to experimental test, and of yielding the predictions that are necessary both to the theory of evolution and the practice of plant and animal breeding."

It is quite relevant to study that cultural differences are traceable to differences in the chromosome recombination system, as observed between the two sexes amongst human beings. The above group may again be quoted, "Further, cytology agrees in showing that chromosomes actually cross over at meiosis in the normal way as the rules of inheritance suggest. And the male, the sex with the higher mortality, is the heterozygous sex. Genetically, the two sexes differ, perhaps, much as two species differ. They are mutually adapted for purposes of reproduction. But each is also adapted to its special cultural activities. In these the two sexes are complementary but differently adapted in different races, classes and stages of evolution, matriarchal or patriarchal, monogamous or polygamous, slave or free, agricultural, nomadic or predatory."

They trace genetic control to language functions also. They state, "It is indeed, possible to draw maps showing the isogenic lines both for blood gene frequencies and for phonetic capacities or preferences. Both of these characters are as nearly neutral in regard to natural selection as one can imagine, and we might, therefore, expect them to reflect equally well the longstanding genetic properties of the population. When we do so we find a remarkable agreement...Students of language have often held the view that some inherent property of peoples influences the sounds they use and the changes their use undergoes. We now see the undefined 'substratum' assumed in linguistics is the aggregate genotype action of the community...Thus the study of phonetic preference and its historical changes and geographical distribution may provide us with a key for a new and genetic approach to one of the simplest but most significant aspects of the history of culture."

Keosian (1960) in the study of origin of life, brings forward the concept of recurring biogenesis, that is, neobiogenesis continues to occur now-a-days and ever since the first origin of life, previously thought to have been many millions of years ago. He continues to state, in the context of a proposed modification of the monophyletic theory of (organic) evolution, "concretely, it would appear more plausible to accept present-day viruses as units of recent and present origin than to suppose that they descended through some two billion or more years relatively unchanged. Throughout time viruses either evolved into higher organisms or were eliminated in the process of evolution, being ever re-established through neobiogenesis . . . The difficulty of placing viruses, bacteria, certain 'algae', sponges and so on, in a fitting place in any taxonomic scheme based on a monophyletic hypothesis may stem from the possibility that the discontinuities are real and represent the existence of separate lines of descent from independent instances of neobiogenesis at different times in the history of the earth down to the present."

Some workers have pointed out that the virus of herpes zoster can arise spontaneously in man without infection from outside due to the activity of plasmogenes which distorts protein metabolism to this length.

If we bring in the concept of neuronic paedomorphism (Harper, 1958) which states that neurones are at embryonic stages of development biologically even in mature human adults, the probability of plasmogene activity to renascentise to foetal levels is easily conceivable.

The probability of renascentisation is more likely when it is realised that human and animal cells undergo anaplasia and metaplasia under abnormal conditions.

It may also be stated that the differences in the activity of the biological basis in case of regression which is a widely accepted psychic state and the activity to be postulated for renascentisation to occur are merely quantitative and not qualitative.

It has already been studied that the plasmogene activity which is not fully under the control of the nucleus through the nuclear membrane, may either be in the direction of infection and viral activity or may be in the direction of adaptation and development in response to kinetogenesis ; the viral and adaptational poles may act as obverse and reverse vectors (Nand, e), one working on biochemical lines in direct antagonism to the other.

One of these vectors, namely, viral vector, has been observed (Nand, f) to be the organic basis of 'death-instincts' of the psychoanalytic literature and the other vector, namely, adaptational vector, has been observed to be the organic basis of the 'life-instincts' of the psychoanalytic literature.

The essential feature of the viral and developmental polarities of the plasmogene-independent activity depending on the RNA is that the one may act in total antagonism to the other. This makes us understand how when one pole is acting on the pattern of progression, the other may act on the pattern of regression and renascentisation of early infantile, neonate and foetal pattern of cytodynamics and cyto-ecology in man.

Relevent to the issue here also is a review of brain mechanisms and consciousness where Langworthy (1958) quotes Fessard in the statement, "Fessard provided a critical and comprehensive review of the basic issues of the conference which is too fundamental to consider in detail here. He spoke of consciousness as an aspect of life in action or experienced integration. There may be a rudiment of consciousness in living beings that are devoid of functional cortex or experimentally deprived of it." Surely, the foetus and the neonate are at a better state of neuronic integration in man, than this low level of requirement for some sort of consciousness to exist in them.

He continues, "Full consciousness would appear as a mere enrichment of crude consciousness, as a result of projection of cortical patterns of activity down to a specific centre. Fessard spoke of the dynamic intrinsic properties of reticular arrangements of neurones with short axons. Reticular systems behave as a multiple transmitting system. They can receive messages without immediately giving out orders, working as integrators. They exhibit spontaneous activities generally in a rhythmic form and exert actions as pace makers. In reticular systems there are no private lines, axon collaterals form overlapping fields where each impulse loses its individuality." If the specific systems are proved not to be able to renascentise, the ability of the reticular systems to do so is yet available as the organic basis of renascentisation and regression. He continues further, "Transient organisations of the conscious present have a thickness in time which cannot be neglected. Time and experienced integration are related in an orderly sequence of integration according to rules that escape our understanding." The rules have to be based on biochemical and biophysical laws and the recent advances of genetics and cytology are working in the field, very near to the required solution of the problem.

Buhler (1959) in dealing with "life's basic tendencies" discusses the original psychoanalytic model, Franz Alexander's theory of creativity, Karl Buhler's theory of three types of pleasure, the concept of mastery, Maslow's self-actualising people, M. French's concept of integration, the role of appraisal and self-appraisal, the theory of self-realisation, the concept of fulfilment including existentialist ideas about life's self-transcendence and relates to the theory of four basic tendencies of life. She brings her findings in line with the revision of homeostasis principle as proposed by the Chicago Interdisciplinary Conference of 1951 and their thesis that 'maintenance' as well as 'change' are equally primary tendencies. She states, "They are called need-satisfaction and upholding of the internal order as sub-categories of 'maintenance' and adaptation as well as creativity as sub-categories of 'change'. Their pathologic opposites are need-frustration, internal disorder, non-adaptation and unproductivity."

Renascentisation and destructuralisation are covered by the concept of 'change' and restructuralisation is covered by the concept of 'maintenance'.

Both adaptive behaviour and play have been studied to be due to uncontrolled plasmogene activity (Nand, g) while maintenance is covered by the integrated and structured plasmogene—nuclear membrane-nucleus pattern of structured activity and function at somatic levels or at conditioned routine behaviour.

Among many other links connecting behaviour with cytodynamics, cytology and cyto-ecology in general and genetics in particular may be added the work on genetics reviewed by Kallmann (1960). Among others, the fact that mongolism was found by Lejeune's team to result from nondisjunction of chromosome 21, and his final remark, "these discoveries opened a long-sought gateway to mapping of human chromosomes, a pre-requisite for identifying basic abnormalities in disordered behaviour patterns" are relevant to correlation of behaviour with molecular and microsomal states ;

constitution structure and renascentisation being indirectly studied.

Bailey (1960) has also exhaustively dealt with, in a general resumé, about the relationship between psychodynamics and biodynamics, and what we may expect in future.

A study by the methods of total psychoanalysis (Nand, 1947, 1950) of the creative process and the moral developmental stages in man, has led the author to lay great emphasis on the phenomenon of renascentisation and its associated phenomena of refoetalisation—foetalism—rebirth as well as the operation of obverse and reverse vectors (in terms of free plasmogene activity) or life-vector and death-vector (Nand, a).

These phenomena have been observed to be the basis of surplus energy concept of Franz Alexander. I find play is due to 'surplus energy' but its main role is renascentisation and generation of more and more 'surplus energy'. There is a case of self-propagating and self-perpetuating machine. Play begins with 'surplus energy' due to side-reaction at the organic basis of routine behaviour, but generates 'surplus energy' transferable due to the operation of reverse vector at plasmogene level to adaptive behaviour or work.

The viral plasmogene activity, as the basis of play, has in the process of homeostasis under the control of cytoplasm—nuclear membrane—nucleus, to undergo equal and opposite activity by the adaptational plasmogene activity to bring about equipotentiality as well as sterochemical and stoichiometric equipolarity as in the origin of antibodies from antigens. The processes tending towards equipotentiality bring about new perceptualisations and new conceptualisations in term of error and trial and trial and error. These work through the biophysical apparatus that the brain is, and that has been studied by the cybernetists, both the energy and conceptual basis of adaptive and creative behaviour, both in its overt and covert processes and content.

During sleep, equipotentiality and equipolarity are attained and the 'machine' is in a state of *tabula rasa*, again available for the day's routine, play, adaptive and creative behaviour, again producing asymmetric microsomes, in the sphere of DNA and RNA.

In the biological field the problem of asymmetric organic synthesis in the field of macromolecules is being studied by *in vitro* experiments.

Keosian (1960) states, "Intramolecular displacements and conversion of racemates are not the property of living things or enzyme systems only . . . Other factors which affect stereo-specific polymerisation are discussed by Natta in a later paper. Some of these polymers on crystallographic analysis, appear to have a helical structure and are formed by terminal addition of manoeuvres ; this brings to mind the end-chain addition of mononucleotides to deoxy-ribonucleic acid (DNA) primer and to ribonucleic acid (RNA) . . . It was found that the active catalytic centres are metallo-organic complexes which exist in en-antiomorphous pairs, each member controlling the synthesis of the corresponding antipolar polymer. The result is a mixture of optically active antipodes. This resembles stereo-specific synthesis in living forms where each stereo-isomer has its corresponding enzyme and differs from the usual abiotic synthesis of stereo-isomers, in which both antipodes result in equal number from the same catalyst. In the latter case a single mechanism operates, and chance determines the alignment of an asymmetric centre in any of its possible positions. It is not possible to separate such a process into different specific stereo-isomeric syntheses. In the former case this is conceivable, and as Natta points out, it would be of 'remarkable interst' to isolate the asymmetric active centres corresponding to only one of the two en-antiomorphous forms, 'since it would solve the problem of asymmetric organic synthesis in the field of macromolecules'.

"Many important developments can be expected from this new research field. These considerations raise the question whether some resolution of racemic mixtures could already have taken place or optical activity could have already occurred before the emergence of life, the occurrence of specific antipodes in the first organism thus being not merely left to chance."

The plasmogene functions under nuclear DNA control is a closed system tendency, in term of the second law of thermodynamics. The second law states that in any closed system there is a constant tendency towards degradation and chaos or increase in entropy. The second law has been worked out in the context of heat energy. The second law has not been proved for the living creatures. Freud's death instinct has been interpreted as application of the second law in the psychological sphere (Ostov, 1958). The existence of plasmogenes and their free activity dichotomised into the viral activity and developmental activity has developed in higher animals *pari passu* with biological evolution. The viral activity of plasmogenes may produce endogenous viruses like that of herpes zoster or may produce tumours or malignant tumours. The developmental activity, still in continuity with the closed system drive, may produce repair or evolutional kinetogenesis (mechanical genesis).

The viral activity is thus the open system drive and is in opposition to the developmental activity

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of plasmogenes or the closed system drive. The former has been studied to be the basis of death-instinct (Nand, c and d) of Freud or death-vector or the reverse vector leading to destructuralisation and renascentisation. The developmental activity has been studied to be the organic basis of adaptive behaviour or life-instinct of Freud, life-vector and the obverse vector, in continuity with the dominant tendency in biology of living, struggle for existence, adaptation to environment and exploitation of environment, specially observed in adaptation to land, air and cave life.

The mind of animals is in biochemical and biological levels based on the rigid control in neurones and endocrines of genes in the nucleus exerted through the nuclear membrane on the cytoplasmic plasmogenes. This control is related ultimately to the biochemistry of DNA dominant in the nucleus and RNA dominant in the cytoplasmic plasmogenes. The plasmogenes have been getting more and more out of the control of the rigid patterns of the nuclear biochemical constellations as evolution advanced. The relative frequency of a multiplicity of carcinoma, autoimmune disease and the so-called collagen diseases and stress-responses in general are evidence in favour of the plasmogenes having attained the highest and greatest degree of this freedom in man.

The dual plasmogene activity is the basic biological dialectic. This basic dialectic has expressed itself in numerous forms in the psychological functioning levels. The various schools of psychoanalysis have interpreted the effects of this basic biological dialectic in different terminology. In mythologies it has been expressed as gods of destructions and gods of preservation co-ordinating in total Godhood.

The foundations of psychodynamics when built on this biological foundation has been demonstrated in the work in psychodynamics by the author to produce advantageous results both in the theory and practice of psychotherapy and psychoanalysis. Mind of man is a homeostasis to various grades, levels and patterns of the various units of this biological dialectic in the specific cultural *milieu* and environmental experiences including both the opportunities and frustrations, throughout life.

Conclusions and Summary

The central nervous system in man is paedomorphic, that is, to say, it retains embryologic characteristics.

Plasmogene activity in cytoplasm is capable of producing viruses by its own activity. The production of the virus of herpes zoster has been so demonstrated in man. The piracy-like activity or vital activity is counterbalanced by developmental activity of plasmogenes which allow cells to repair, to produce malignant tumours and to respond to mechanical strain and stress resulting in kinetogenesis which is a recognised factor in the origin of species in the recent work on this subject.

Normally in man and mostly so in lower animals, plasmogenes work under the control of the genes of the nucleus through the nuclear membrane.

Under stress and strain plasmogenes are liable to take on viral or developmental activity independent of or against the nuclear controlled pattern of routine activity. This is called in this paper renascentisation of embryonic characteristics and is also called attempts at 'destructuralisation'. These phenomena have been observed in studies of malignancy and carcinogenesis. The human nervous system being paedomorphic this renascentisation as an increase in paedomorphism is all the more facilitated.

The findings of various workers in the related fields are quoted to demonstrate the validity of the biological aspect. At the same time, the study of psychodynamics, total psychoanalysis and studies of dream-work by the author are reviewed in a correlational study with the study of biodynamics and cytodynamics.

The schools of Freud and Klein base their psychodynamics on life-instincts and death-instincts as well as on the axiomatic application of the second law of thermodynamics. This aspect of their work and of the work of the author are studied in the light of recent biological work.

References

Bailey, P.—*A. M. A. Arch. Gen. Psychiat.*, **2** : 361, 1960.

Bellak, L.—Schizophrenia, 1958, Logos Press, New York, p. 300.

Buhler, C.—*Am. J. Psychotherapy*, **13** : 561, 1959.

Cameron, N.—A Biosocial Interpretation, 1947, Houghton Milfin Co., Chicago, p. 19.

Harper, R. M. J.—*Lancet*, **2** : 92, 1958.

Kallmann, F. G.—*A. M. A. Arch. Neurol.*, **12** : 363, 1960.

Krosian, J.—*Science*, **131** : 477, 1960.

Langworthy, O. R.—*Am. J. Psychiat.*, **114** : 593, 1958.

Lederberg, J.—*Science*, **131** : 271, 1960.

Nand, D. S., a—Report on the Work of Dr. D. Satyanand and Postscript, privately published by the author.

Idem, b—g—Papers in the press.

Idem—Objective Method of Dream-Interpretation, 1947, Rama Krishna & Sons, New Delhi.

Idem—Methods of Total Psychoanalysis; Findings of Total Psychoanalysis; 1950, Rama Krishna & Sons, New Delhi.

Ostow, M.—*Internatl. J. Psycho-Analysis*, **34** : 17, 1958.

CASE NOTE

'STIFF-MAN' SYNDROME

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Ornsteen (1935) first described this syndrome and Moersch and Woltman (1956) reported a comprehensive survey of their 14 cases. Asher (1958), Campbell (1958), O'Connor (1958) and Price and Abbott (1958) described additional cases. The most characteristic feature of this entity is relentless, progressive, rigidity of the skeletal muscles. This monotonous story is interrupted, here and there, by severe painful spasms of the affected musculature. No treatment seems to arrest the disease or afford even symptomatic relief. In view of the rarity of the condition and our limited knowledge on the subject, the preliminary report of a case is presented:

Case Report

C. R., a farm labourer, aged 45 years, was admitted to the Himachal Pradesh Hospital on October 15, 1959. He complained of progressive stiffness in the muscles of the trunk, abdomen and thighs for the last three years. His working capacity had impaired during the last one year.

The onset had been slow and insidious. Twice he had been in bed for 3 to 4 weeks, with severe painful spasms principally of muscles of the lower abdomen and thighs which made him cry aloud. During one of these episodes he was treated for chronic tetanus in a local hospital.

The past and family history did not reveal anything of importance. The physical examination was normal except for board-like rigidity in muscles of the trunk and abdomen. The thigh muscles were involved to a lesser extent. The affected muscles were stone-hard, not tender, and immobile. There was no wasting or fibrillation. The overlying skin was freely mobile and normal. The rest of the body (viz., head, neck, upper and lower limbs below the knees) was normal. Neurological examination revealed no positive findings. Evidence of psychosis was absent.

The laboratory tests, including examination of urine, stool, haemoglobin estimation, total and differential white cell counts, haematocrit, E.S.R., estimation of blood proteins, blood calcium, blood chloride, blood phosphorus, blood cholesterol and bone marrow studies were normal. The oral glucose tolerance test revealed presence of reducing substance in the urine. The skiagram of the chest, cervical spine, lumbodorsal spine, hip and sacroiliac joints showed no abnormality. Electromyography and creatinine output could not be done. E.C.G. was normal. Muscle biopsy showed normal muscle pattern.

Treatment with aspirin, phenylbutazone, muscle relaxants and physiotherapy did not produce any change in the rigidity. The acute spasms, however, gradually subsided in 4-5 weeks, and the patient has been free from them for 2 months now.

Comments

Steady but progressive rigidity, with or without severe and painful spasms in the affected muscles, constitutes the main feature of this rare syndrome. Moersch and Woltman (*loc. cit.*) found preponderant involvement of neck or trunk muscles in the majority of their 14 cases. Price's case started with dislocation of the thumb as the initial symptom. The muscle spasms can be violent enough to fracture a leg and break the steel fittings used to repair it (Asher, 1958). O'Connor reported bending of Smith-Petersen nails in his case, during a severe spasm. In the present case, the pain in such paroxysms was so severe as to make a robust labourer cry aloud in agony.

Multiple laboratory studies have failed to reveal the cause of this distressing condition. In the present case, no abnormality was detected, except the presence of a reducing substance in the urine. Moersch and Woltman (1956), Asher (1958), Price and Abbott (1958) also found the same in some of their cases. Whalen *et al.* (1959) reported abnormal phosphate metabolism, leukopenia and glycosuria in their case. These findings lend support to the concept of a metabolic defect. But this evidence, alone, is not conclusive.

The differential diagnosis includes consideration of dystonia musculorum deformans, myositis fibrosa generalisata, chronic tetanus and syphilitic myositis. The torsion-spasms of the myostatic type can result in rigidity and defective posture but it is a painless condition with a different distribution of rigidity. The muscle rigidity, with no abnormality on general or neurological examination suggests myositis fibrosa generalisata or fibromyositis. But the prolonged history and the steady but surely progressive course, interspersed with violent muscle spasms, are not like those of fibromyositis. Sparing of the jaw muscles and the progressive nature of the disease is enough to exclude chronic tetanus.

Acknowledgment

Our thanks are due to Dr. B. M. Bhardwaj for his help in the laboratory investigations.

References

Asher, R. A.—*Brit. M. J.*, **1**: 256, 1958.

Campbell, E. D. R.—*Ibid.*, **1**: 395, 1958.

Moersch, F. P. and Woltman, H. W.—*Proc. Staff Meet. Mayo Clin.*, **31**: 421, 1956.

O'Connor, D. C. J.—*Brit. M. J.*, **1**: 645, 1958.

Ornsteen, A. M.—*Ann. Surg.*, **101**: 237, 1935.

Price, I. M. L. and Abbott, E. N.—*Brit. M. J.*, **1**: 682, 1958.

Whalen, R. E., Combs, J. J. Jr. and Deiss, W. P. Jr.—*Am. J. Med.*, **27**: 678, 1959.

JOURNAL OF THE
INDIAN MEDICAL ASSOCIATION

CALCUTTA, DECEMBER 16, 1961

HAZARDS OF MEDICAL USES OF RADIATION

Reports have appeared in the medical literature expressing fear that medical uses of ionising radiation may during the life-time of an individual, result in the production of cancer, leukaemia and reduction of life-span. Stewart *et al.*[1] at Oxford found that pelvimetry had been done with greater frequency in mothers of leukaemic children than in mothers of control children of similar age and sex distribution selected at random in the general population. Court-Brown and Doll[2] showed increased incidence of leukaemia in patients suffering from ankylosing spondylitis who were given x-ray therapy to their spine. High incidence of leukaemia amongst survivors of the atomic bomb explosions in Japan and of lung cancer in uranium miners is well known.

One group of workers believes that even the smallest doses of radiation such as those employed in diagnostic radiology tend to raise the incidence of leukaemia and malignant disease. They believe that there is no threshold below which the somatic cells cannot be changed so as to produce leukaemia. The other group of optimists believes that the doses employed in diagnostic radiology are not high enough to produce leukaemia or cancer and that there is a threshold for radiation below which no harm is done.

Recent experimental work on laboratory animals has shown that changes in the environment rather than a mutation of a somatic cell is responsible for the production of leukaemia and cancer. The hazards of difficult labour rather than of radiation could have been a cause of leukaemia in children whose mothers were subjected to pelvimetry. Also convincing conclusions cannot be drawn from the type of enquiry conducted by Stewart *et al.* (*loc. cit.*). In ankylosing spondylitis the risk of a very small number of patients developing leukaemia is worth taking because radiotherapy offers a definite and at present the only change of cure to well established case of this disease who would otherwise be doomed to a miserable life.

Studies by Seltser and Sartwell[3] in the United States and Court-Brown and Doll[4] in the United Kingdom have failed to disclose any significant life-span shortening reported earlier by Warren.[5]

The real hazard of radiation lies in exposure to the gonads. Even the smallest dose is capable of producing gene mutations in the germ cells. These mutations in most of the cases are of a harmful nature. Majority of the mutations are recessive. The genetic harm done by radiation depends upon the cumulative total dose received by the gonads of a large number of members of a population of child-bearing age rather than upon the dose received by the gonads of a particular individual. We owe it to the future society to minimise as far as possible the addition of further mutations to the genetic pool.

Gene mutations can be produced by activities of our society which contribute little to our well being and yet no notice is taken of them. It has, for instance, been calculated that 85 per cent of spontaneous mutations in the male would be due to the rise in temperature produced simply by wearing trousers. If a radiological investigation is not carried out for fear of a possible genetic damage a correct diagnosis may not be made or may be delayed which would lead to denial of correct treatment and a continuation of the disease process resulting in a greater harm to the germ plasm and the genetic pool.

A critical examination of the available evidence shows that hazards of medical uses of radiation have been unduly exaggerated. These hazards are no greater than the hazards, for instance, of cigarette smoking, of driving an automobile, of living in a dust-laden atmosphere, of exposure to sun and even of wearing clothes. Care should, however, be taken to reduce roentgen ray exposure. Radiotherapy for benign conditions should be avoided as far as possible. Most routine pelvimetries should now be eliminated. Use of filters, multiple leaf collimators and gonadal shields in children and young adults must be enforced. Free recourse to fluoroscopy and roentgenography by those lacking special training in this field should be discouraged. Indications for diagnostic radiological examination involving exposure of the gonadal region to the primary beam should be judiciously and carefully weighed.

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[1] STEWART, A., WEBB, J., GILES, D. AND HEWITT, D.—*Lancet*, **2**: 447, 1956.

[2] COURT-BROWN, W. M. AND DOLL, R.—Leukaemia and Aplastic Anaemia in Patients Irradiated for Ankylosing Spondylitis: M.R.C. Special Report, 1957. H. M. Stationery Office, London.

[3] SELTSER, R. AND SARTWELL, P. R.—*J.A.M.A.*, **166**: 585, 1958.

[4] COURT-BROWN, W. M. AND DOLL, R.—*Brit. M. J.*, **2**: 181, 1958.

[5] WARREN, S.—*J.A.M.A.*, **162**: 464, 1956.

PRESIDENT'S PAGE

During the last week of April 1961, I visited Delhi and held meetings of the following Standing Committees and Sub-Committees:—(a) Building Standing Committee. (b) The Insurance Standing Committee. (c) Defence Council Sub-Committee.

The actual start on the construction of our Central Office building at Delhi was also made during this week on the 26th. The foundation was dug and a copper cylinder, containing a copy of the Memorandum, Rules and Bye-laws of the Indian Medical Association, a copy of the *Journal of the Indian Medical Association*, a copy of the History of the Indian Medical Association and some new coins, was laid by me in the foundation of a corner pillar and concrete poured over it.

The total estimated cost of the building is expected to be about Rs. 12 lacs.

The building will consist of a five-storeyed administrative block and the auditorium.

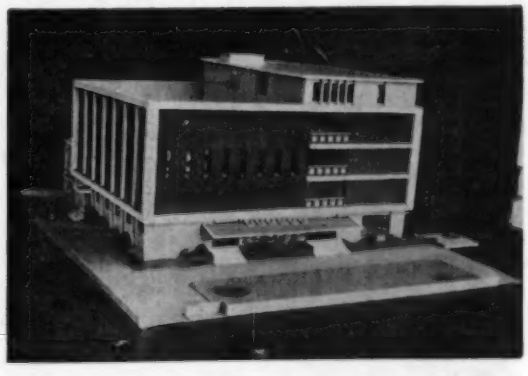
The building will be situated on a main road in Indraprastha Estate on a 5 acre plot facing the building of the Accountant General Central Revenues and flanked on one side by the building of the Central Board of Revenue. It is centrally situated and is easily accessible from different parts of Old and New Delhi.

The building has now started in right earnest and it is expected that the office part of the building will be completed soon.

DR. H. N. SHIVAPURI, PRESIDENT, INDIAN MEDICAL ASSOCIATION, RECEIVING A COPPER BARREL (CONTAINING MEMORANDUM, RULES AND BYE-LAWS OF THE ASSOCIATION, A COPY OF THE HISTORY OF THE ASSOCIATION, A COPY OF *Journal of the Indian Medical Association* AND COINS) FOR BEING PUT INTO THE FOUNDATION, FROM SHRI V. M. KULKARNI, EXECUTIVE OFFICER (26TH APRIL, 1961)

DR. C. S. THAKAR (A PAST PRESIDENT) AND DR. P. C. BHATLA (HONY. JOINT SECRETARY) (*extreme left*) POURING CONCRETE IN THE FOUNDATION WHILE DR. H. N. SHIVAPURI (PRESIDENT) (*extreme right*) LOOKS ON.

DR. P. C. BHATLA (HONY. JOINT SECRETARY), DR. VED PRAKASH (HONY. JOINT SECRETARY), DR. R. C. GOULATIA (HONY. TREASURER), AND DR. D. S. MEHRA (HONY. ASSISTANT SECRETARY) POURING CONCRETE IN THE FOUNDATION



PICTURES OF THE MODEL OF THE PROPOSED BUILDING OF THE INDIAN MEDICAL ASSOCIATION SHOWING THE FRONT AND SIDE VIEWS OF THE ADMINISTRATIVE BLOCK (*left*) AND THE AUDITORIUM (*right*)

AN APPEAL BY THE PRESIDENT FOR DONATION TO THE I.M.A. BUILDING FUND

Probably you are aware that the Indian Medical Association Building Fund was originally started at the Sholapur All India Medical Conference by our old stalwarts like Dr. T. N. Banerjee, Patna and Late Dr. Bhupal Singh, Meerut. You are also aware that the Indian Medical Association building will cost about rupees ten lacs and as the prices of building material have recently gone up it may cost something more than ten lacs. I am happy to inform you that the construction of the building has already started and at least a part of the building, I expect, will be ready soon, thus enabling our Central Office to move into our own home. That should be a matter of pride for all of us.

But what is NOT a matter of pride so far for us is the position of our building fund. It has not yet reached even a figure of rupees three lacs and it seems that rupees ten lacs is a far dream for us. But it ought not to be so. It has been estimated and placed before you all repeatedly that if on the average every member of the Indian Medical Association contributes rupees fifty per head, the ambition of collecting rupees ten lacs will be fulfilled. The opportunity was given to contribute this amount by instalments. The average of rupees fifty per head is not a big sum for members of the Medical Association to contribute particularly when it can be done by instalments. It is a far cry from the days of Sholapur Conference held years ago up to the middle of 1961. But to my regret and our shame we have not been able to achieve the object so far.

It is possible that each of us is not in a position to contribute rupees fifty per head and if some members are not able to pay that amount, there are plenty others who can give much more. Some have already paid and we are grateful to them but a lot more has to be done to reach the target figure. I appeal to all members of the Indian Medical Association to do their mite and give as much as possible so that the building can be completed soon. Those who contribute rupees one thousand and over will have their names engraved on a marble panel to be fixed at the entrance to the building. But my appeal to all members of the Association is that each member must contribute something so that he may have the pride to say that at least some bricks of the new building were purchased out of his contribution. I appeal to all Branch Presidents, and Secretaries—State, Territorial and Local—to do their best and collect contributions as early as possible and transfer them to the Central Office. I may also remind those friends who have promised but not yet sent the money, to fulfil their promises and send the cheques to the Central Office as soon as they can. In this connection if any State, Territorial or Local Branch, intends to have a special drive for this purpose, I shall be happy to come and offer my help if such help is considered useful. Finally, our slogan should be "Each member contribute your utmost to the building fund".

PRESIDENT'S TOUR

Orissa, West Bengal and Uttar Pradesh

From 11th to 16th of May, 1961 Dr. H. N. Shivapuri, President, Indian Medical Association, visited Orissa and attended the State Medical Conference at Berhampur (Ganjam) as also the meeting of the State Branch Council and the State Branch Working Committee. The Conference was quite well organised. He was the chief guest of the conference and spoke at the meeting on various important subjects affecting the profession. He also appealed to Orissa Branches for their share of the contributions for the Indian Medical Association Building Fund. It was his impression that Orissa would contribute as liberally as they could. One interesting decision taken by the Orissa State Branch Council of the Indian Medical Association was to pay up all CFC arrears up to date from their funds, even though certain payments were yet to be received from the local branches. This was a very good gesture on the part of the Orissa State Branch and should serve as an example and an eye-opener to some of the bigger and richer State branches.

* * * *

On his way to Orissa Dr. Shivapuri stopped for a few hours at Calcutta on 12th of May. He took advantage of this and went up and saw the new Journal Office at 53, Creek Row, Calcutta. He was happy to see the Journal installed in a proper and roomy office building and felt sure that the Journal would now improve further. He wished the Editor and other members of the staff the best of luck.

On his way back from Orissa he again halted at Calcutta and availed of the few hours at his disposal by meeting by previous arrangement many of his Calcutta friends at the office of the Bengal State Branch. He discussed with them the latest position regarding the crisis facing the Indian Medical Association.

* * * *

From 30th May to 2nd of June, Dr. Shivapuri visited Nainital to attend a meeting of the Central

Family Planning Board. On the evening of 1st June the Nainital Branch organised a small but very pleasant function to enable the President to meet members of the branch as also others who happened to be in Nainital at the time. Dr. Shivapuri spoke at the meeting on several important matters facing the Indian Medical Association including the Building Fund.

Andhra Pradesh

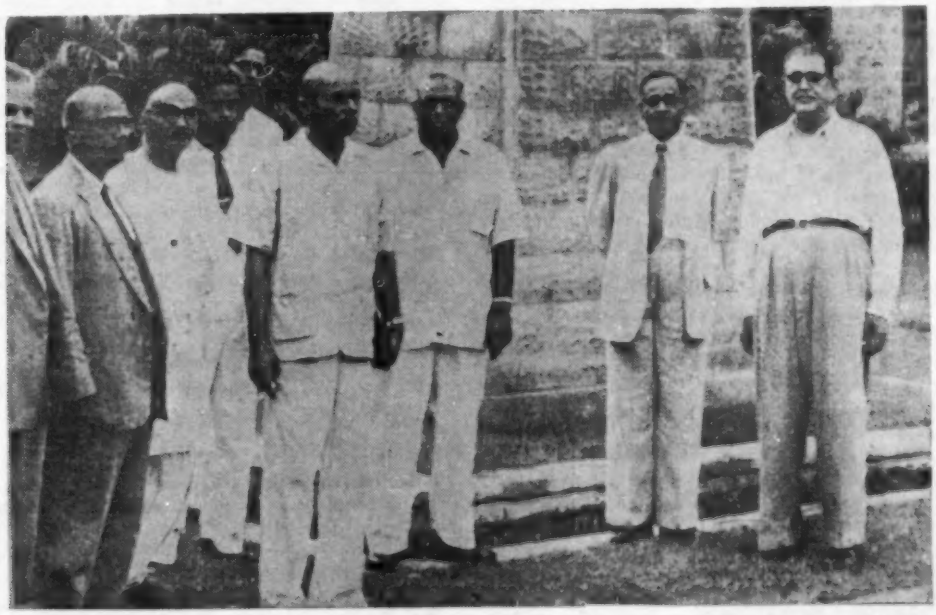
Dr. H. N. Shivapuri, President, visited six branches of the Indian Medical Association at Vijayawada, Guntur, Tehali, Ongole, Nellore and Chittoor in three days starting from 11-10-61. The tour was organised and conducted by the Andhra Pradesh State Branch. The journey throughout the one thousand miles was by road. The President, the Secretaries and other office-bearers of the Andhra Pradesh State Branch accompanied him right through, and the Regional Vice-Presidents and Regional Joint Secretaries followed him through their respective regions.

On 11.10.1961 the President and party were shown round the Medical College and the General Hospital at Guntur by Dr. Muniswamy, the President of the Guntur Branch.

At Tirupathi on 12.10.61 the President and party had the *darshan* of Lord Venkateswara (Balaji) and worshipped at His feet. Special arrangements for the stay and worship were made by the Executive Officer of Tirupathi Tirumalai Devasthanam, who was personally present to receive the President.

The President was welcomed and feted at every place. The achievements of the local secretaries as well as their local problems were presented to the President. Dr. Shivapuri advised the branches on their local problems and posed the various problems confronting the medical profession in the country as a whole for the serious thought of the members. He appealed to members to have more intimate contact with the masses, to undertake medico-social work in villages, to pay greater attention to Medical Ethics and to uphold the dignity of the profession. While deploring the increasing number of criminal charges being foisted on members in Government Service, he appealed to those members in service to keep themselves above board and not to give room for suspicion.

He apprised the members of the efforts being made by the Association to form a Defence Council Insurance Scheme. Finally, the President appealed to the members to donate liberally to the Central Building Fund for the construction of the Indian Medical Association Building at Delhi.



Photograph Taken in the Campus of the Guntur Medical College (Andhra Pradesh), the Venue of the Special Meeting Convened in Honour of the Visit of Dr. H. N. Shivapuri, President of the Indian Medical Association (*extreme right*)

CURRENT MEDICAL LITERATURE

Mortality from Primary Tumours of Bone

MACKENZIE, A., BROWN, W. M. C., DOLL, R. AND SISSONS, H. A. (*Brit. M.J.*, **1**: 1782, 1961) from London write:

The mortality attributed to primary malignant tumours of bone in England and Wales in 1951-3 has been examined. These years were chosen because 1953 was the year in which the first megaton nuclear bomb was exploded and suitable data were not available for any year before 1951.

Records of deaths attributed to primary malignant tumours of the bone in persons, aged under 65 years, were examined by the General Register Office and a questionary was sent to the doctor who signed the death certificate or to the hospital in which the patient had been treated.

Evidence about the nature of the diagnosis was obtained for 990 cases out of a total of 1,169—i.e., for 84·7 per cent. In 516 cases (52·1 per cent) the diagnosis of a primary bone tumour was confirmed; in 449 (45·4 per cent) the diagnosis was thought to be not a primary bone tumour, and in 25 (2·5 per cent) the diagnosis was uncertain.

The diagnosis was found to be more reliable: (1) for deaths occurring in hospital (57 per cent confirmed) than for deaths occurring elsewhere (48 per cent); (2) for men (55 per cent confirmed) than for women (48 per cent); (3) for deaths at ages 15-19 years (86 per cent confirmed) than for other ages (40 per cent at ages 45 to 64 years); (4) for deaths attributed to primary tumours of a bone in the lower limb (77 per cent confirmed) than for primary tumours of other bones; and (5) for deaths in which Paget's disease was said to be associated with the tumour (98 per cent confirmed), or in the absence of Paget's disease, for deaths in which the tumour was specified as being a particular histological type of sarcoma (86 per cent) than for carcinoma or cancer of bone (4 per cent).

The pathological description of the tumour given by the certifying doctor was the most important factor. After it had been allowed for there was still some difference between the reliability of the diagnosis for different bones and, possibly, for deaths occurring at ages 10-24 years and at other ages.

The additional information obtained for 990 deaths allowed an estimate to be made of the proportion of the remaining deaths which were properly attributable to primary tumours of bone. It could then be estimated that 597 deaths from primary bone tumours occurred among persons aged under 65 years in England and Wales during the three years 1951-3. The minimum annual mortality was estimated to be 6·3 per 1,000,000 men and 3·9 per 1,000,000 women. The true figures must be somewhat higher, as some of the 25 deaths in which the diagnosis was uncertain were probably due to bone tumours and some deaths will have been misclassified under other rubrics.

Examination of the sex and age-specific mortality rates attributed to different bones shows that:

1. The maximum mortality from tumours of the limb bones is recorded in both sexes at ages 15-19 years; at this age the ratio of the male and female rates is also at a maximum (2·1 to 1).

2. The mortality from these tumours falls from age 20 to 34 years and rises again from age 40 years.

3. The increase at ages over 40 years is largely due to tumours associated with Paget's disease; the mortality from tumours of the limb bones not associated with Paget's disease increases slowly between ages 35 and 64 years and is equal in both sexes.

4. The mortality from tumours of bones other than limb bones shows only a faint peak at ages 20-24 years.

5. At ages under 45 years the mortality is approximately equal in both sexes.

6. At ages 45 years and over there is a sharp increase in the mortality among men but very little increase among women. In the absence of Paget's disease the discrepancy is more marked and among women the mortality remains practically constant. The male excess in this group is due principally to tumours of the ribs and shoulder-girdle.

No significant difference in the geographical distribution of bone-tumour mortality has been demonstrated.

New Developments in Carcino-Chemotherapy

BERGEL, F. (*Brit. M. J.*, **2**: 399, 1961) from Chester Beatty Research Institute, Institute of Cancer Research, Royal Cancer Hospital, London, writes:

A considerable number of drugs for systemic and perfusion chemotherapy are at the disposal of the clinician. They are at present not ideal remedies, and thus have to remain in the hand of the specialist. However, improvements in toxicity and selectivity may follow the lines recommended. The practical use of immunotherapy and replacement therapy in clinical medicine depends very much on future progress, and so it is believed, to a large extent on a concerted effort in many laboratories to create a series of tests which would assist in a biochemical characterisation of human cancers. This, together with the old-established morphological description as given by the pathologist, should enable the clinician in collaboration with the practitioner to arrive at the right choice of treatment—surgery, radiotherapy, or chemotherapy, or any of their combinations—to remove the deadly sting from these up to now far too often killing diseases.

Gardner's Syndrome

KAPLAN, B. J. (*Dis. Colon & Rectum*, **4**: 252, 1961) from the department of surgery (proctology), Mount Sinai Hospital, Hartford, Connecticut writes:

Familial polyposis of the colon and rectum appears to be a non-sex-linked hereditary disease, due to a single mutant or pleomorphic gene, which is transmitted as a Mendelian dominant with the expectation that approximately 50 per cent of the offspring of the affected individual will have the same disease.

In recent years the association of familial polyposis with multiple epidermoid cysts and soft or hard fibrous-tissue tumours has been recognised and called Gardner's syndrome. The true syndrome embodies developmental defects of all three germ layers.

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A case is reported which has all the manifestations of Gardner's syndrome, as well as other interesting features, including a benign, small-bowel tumour, and a congenital anomaly of the anus. Obstructive symptoms occurring during the postoperative period, caused by fibrous adhesions, and the fact that the family history suggested that there had been other similar cases, also, is interesting.

Every patient who has multiple epidermoid cysts, osteomata or other soft fibrous tissue tumours, regardless of his age, should be investigated for familial polyposis of the colon and rectum, and the inquiry should include all living relatives. Such an approach will lead to earlier detection of persons in whom the disease may not be suspected and proper treatment can be administered in time to lessen the incidence of malignancy and decrease the mortality rate, which is such a disturbing feature of this disease.

It is highly desirable that such reliable evidence of polypoid disease of the colon as that encountered in this case report be evaluated properly and that similar cases be reported in the hopes that knowledge of this unusual syndrome can be improved.

Evaluation of the Portacaval Shunt

LARGE, A. M. AND JOHNSTON, C. G. (*M. J. Australia*, **2**: 15, 1961) from the department of surgery of the Wayne State University College of Medicine, the Detroit Receiving Hospital and the Grace Hospital, Detroit, Mich, write:

Much of the confusion and controversy regarding the usefulness and value of the portacaval shunt stems from the failure of those interested in the problem to report partial and complete shunts as separate entities.

The side-to-side portacaval shunt performed with meticulous technical care can be expected to eliminate the risk of massive haemorrhage from bleeding varices in the great majority of patients who are operated upon. This procedure is also of value in the treatment of patients who have intractable ascites associated with cirrhosis of the liver. The severity of the underlying liver disease determines, in large measure, the operative risk. Proper selection of cases for elective shunting procedures can be expected to result in an operative mortality of about 5 per cent.

Since the immediate mortality of massively bleeding oesophageal varices is high despite all measures presently available, the prophylactic portacaval shunt is recommended for patients with known varices, who are satisfactory risks, even though no bleeding has occurred.

Underlying liver disease is a limiting factor in most of these patients; yet shunting of part of the portal blood away from the liver does not appear to have any deleterious effect upon liver function in these cirrhotics, and sometimes decongestion of the liver sinusoids appears to allow partial recovery of liver function to occur.

Premalignant Conditions of the Vulva

JEFFCOATE, I. N. A. AND WOODCOCK, A. S. (*Brit. M. J.*, **2**: 127, 1961) from the department of obstetrics and gynaecology, University of Liverpool, write:

Except for the repeated application of carcinogens such as mineral oils, and possibly for chronic granulomatous venereal disease, a local cause for squamous cell cancer of the vulva is not known. Like skin cancer in general, involutionary changes associated with ageing are probably important predisposing factors.

Invasive cancer often begins by way of a field change which may be widespread and in which disorderly epithelial activity is the characteristic histological change. This activity is sometimes so pronounced as to justify the term 'cancer *in situ*', but in lesser degrees should not be labelled 'leucoplakia', for it bears no constant relationship to hyperkeratinisation, which is implicit in this name.

There is as yet no evidence to justify the view that leucoplakic vulvitis, kraurosis (primary atrophy), and lichen sclerosus vel atrophicus are separate disease entities. Judged by either macroscopical or microscopical criteria, these represent no more than a variety of skin reactions to adverse factors which, although obscure, are more likely to be 'general' than 'local'. The type of reaction is dependent on the environment of the vulva and not on the underlying cause. It is therefore suggested that all these names should be abandoned, since they hinder rather than help the elucidation of their causes. In their place, and pending further knowledge, the non-committal inclusive term of chronic epithelial dystrophy is proposed as one convenient for clinical practice.

Clinically, carcinoma *in situ* can simulate a chronic epithelial dystrophy, and can be excluded only by biopsy. Histological examination of all dystrophies reveals abnormal and disorderly epithelial activity in only 4 to 8 per cent of cases. When it does there is possibly a 10 per cent chance of the subsequent development of cancer, but vulvectomy is nevertheless justified as a prophylactic measure.

In the remaining majority of cases of chronic epithelial dystrophy there is no special risk of malignant change and vulvectomy is not justified as a cancer preventive. And as an empirical treatment it does not give satisfactory results even when the skin change appears to be strictly limited and demarcated. Unless the cause is determined and eradicated, epithelial dystrophy recurs in approximately 50 per cent of cases treated by partial or total vulvectomy.

Puerperal Haemorrhage

BACHMEYER, H. AND STOLL, P. (*German M. Monthly*, **6**: 217, 1961) from the department of obstetrics and gynaecology, University of Heidelberg write:

In the past 25 years (between 1934 and 1959) 36,732 women were delivered in the department of obstetrics, University of Heidelberg, and in 200 of them there was abnormal bleeding during the puerperium; an average incidence of 0·54 per cent. During the same period 221 women, delivered elsewhere, were admitted for treatment. In 343, of the total of 421, the uterus was curetted and the histological material studied. In 112 patients retained products of conception were not identified and therefore the cause of the bleeding was not

immediately apparent. This group has been studied in the light of the histological findings and the following aetiological possibilities were discussed :

1. An abnormally increased blood-flow through the dilated vessels of the pelvic organs during the puerperium (pelvic congestion).

2. Hyaline degeneration of the vessel walls in the endometrium and myometrium with loss of the elastic tissue component. This leads to loss of the ability of the vessels to close themselves by invagination of a cuff of the vessel wall.

3. Persistence of the proteolytic activity of the trophoblast and its capacity to erode vessels.

4. Partial sub-involution of the placental site, which is caused by the activity of the local accumulation of placental hormones.

5. Hormonal imbalance which produces postpartum transitional hyperplasia of the endometrium.

Any of these factors either alone or in any combination may cause abnormal bleeding during the puerperium ; their identification may prove difficult from examination of the material obtained by curettage. Since the various causes of the puerperal haemorrhage cannot be defined clinically, digital and instrumental exploration of the uterine cavity is essential. The increase in morbidity following the two world wars lends support to the hypothesis that many of the histologically negative cases of puerperal haemorrhage are "functional" in origin.

Management Of Pulmonary Tuberculosis During Pregnancy

PRIDIE, R. B. AND STRADLING, P. (*Brit. M.J.*, **2** : 78, 1961) from Hammersmith Chest Clinic and the Postgraduate Medical School of London, write :

The records of 103 pregnancies occurring in 73 women with pulmonary tuberculosis, active within the previous five years, were analysed in an attempt to discover any relationship between treatment with chemotherapy, rest given during the pregnancy, or breast-feeding on the one hand and subsequent relapse of the disease on the other.

No relationship could be shown between relapse and rest or between relapse and breast-feeding.

Of those patients who received chemotherapy during pregnancy, none relapsed, compared with 27 per cent of those receiving no chemotherapy.

It is concluded that the pregnant woman with pulmonary tuberculosis showing any signs of recent activity can safely undertake pregnancy and labour without relapse provided she receives adequate chemotherapy at this time. In these circumstances rest is unnecessary and the patient can be ambulant.

Non-infectious patients thus treated can safely be allowed to breast-feed after delivery. Even patients found infectious early in pregnancy can often be rendered non-infectious in time to suckle their infants.

The continued application of routine antenatal chest radiography is essential to discover tuberculosis early enough to ensure this adequate control of the disease by the time of delivery.

Coronary Arterial Calcification

BLANKENHORN, D. H. (*Am. J. M. Sc.*, **242** : 1, 1961) from the University of Southern California School of Medicine, Los Angeles 33, California, writes :

Calcific lesions of the coronary artery do not presently receive as much attention as was accorded them in former years. In adult Americans, visible calcific coronary lesions are invariably atherosclerotic. Review of the English and German literature from 1903 to 1958 reveals no convincing case of Monckeberg's medial calcification of the coronary artery. Examination of 3,500 segments of adult coronary artery by a combination of postmortem radiography and microscopy demonstrates that all visible calcific lesions are atherosclerotic. A rare condition of infancy which is fatal may cause non-atherosclerotic coronary calcification.

Postmortem radiography without injection of radio-opaque material (which obscures calcified lesions) indicates that the most common calcific lesion in the heart of Americans is a coronary calcification. The extent of coronary calcification is not always paralleled by the severity of ischaemic heart disease which results, because dilated coronary arteries may become extensively calcified without becoming occluded and occlusive lesions may be lethal before they are extensively calcified. On the other hand, approximately 90 per cent of hearts with myocardial infarction exhibit one or more calcific coronary lesions. In addition, 5 of 8 hearts from patients dying suddenly of ischaemic heart disease between the ages of 30 and 50 showed calcific lesions visible by postmortem radiography.

Fluoroscopy reveals a small fraction of coronary calcifications which are present in living man. Cinefluorography offers promise as an effective means to identify coronary calcification.

Anticoagulant Treatment In Progressing Stroke

CARTER, A. B. (*Brit. M. J.*, **2** : 70, 1961) from Ashford Hospital, Middlesex writes :

A series of 277 consecutive cases clinically diagnosed as cerebral infarction were seen during 1956-59.

From these patients 80 were selected for a controlled clinical trial of short-term anticoagulant therapy. Four were withdrawn from the trial owing to errors in diagnosis. The selection was made by including those under 70 years of age with a pre-admission history or with clinical signs of a progressing disability and by excluding those who showed loss of consciousness, severe hypertension with a diastolic pressure reaching 120 mm. Hg or more, xanthochromic or blood-stained C.S.F., evidence of hepatic disease or past peptic ulceration.

The results after six months have been analysed and tabulated and suggest that in this series anticoagulant therapy has improved the natural history of progressing cerebral infarction, particularly when the lesion is incomplete at the beginning of treatment. Protection from pulmonary infarction by anticoagulants appears to be established, and this treatment in selected patients seems to be without serious risk.

NOTES AND NEWS

Protection against Radioactivity

A British thyroid specialist has claimed that cough mixture may help protect people from radioactive Iodine 131—a product of nuclear tests. Miss Phyllis George, consultant surgeon at the Royal Free Hospital, London, told reporters: "A tablespoonful three times a day for five days will give you protection from Iodine 131 for three months. The cough mixture must contain potassium iodide, of course, and the best way to protect people properly would be to give them potassium tablets before any fall-out arrived."

She stated that a short course of iodide by mouth would prevent the absorption by the thyroid of radio-active iodine. This, she added, "would protect the gland from the possible carcinogenic effects of the radio-active substance".

Miss George stressed that such a tablet or dose of cough mixture would not protect people from Strontium 90 or other radio-active properties.

Diet Clue Found to Kidney Stones

Dr. Frederick J. Stare of the Harvard School of Public Health, who won the American Medical Association's 1961 award for nutrition research points out, according to *Science Digest*, that recent developments offer hope of lessening the formation of stones in the kidney and bladder. For the first time, such stones can be produced experimentally in animals through diets low in pyridoxine and magnesium. Stones can be prevented by increasing the dietary level of the two nutrients.

Beit Memorial Fellowships

The Beit Memorial Fellowships to promote the advancement by research of medicine and allied sciences are available to Indian nationals. The next election of Junior fellows for the award of such fellowships will take place in May, 1962. Junior fellowships have successive values of £900/-, £950/- and £1,000/- for three years. As a rule superannuation benefits are provided, to which the successful candidates will be required to contribute 5 per cent of the annual stipend and to which the Trust will make a contribution of 10 per cent. Candidates must have taken a degree in a faculty of a University approved by the Trustees in Her Majesty's Dominions, Protectorates and Mandated Territories, India, Pakistan and the Republic of Ireland, or a medical diploma registrable in the United Kingdom. Elections to Junior fellowships are rarely made above the age of thirty-five years. Applications from candidates must be received not later than the 1st February 1962. Candidates must submit evidence that they can be given accommodation in the Departments where they propose to work, which must be either in Great Britain or Ireland. Forms of applications and detailed information may be obtained from the Secretary to the Government of India, Ministry of Health, New Delhi 2.

National Committee for Biophysics Set up

The Government of India have decided to set up a National Committee for Biophysics comprising the following: 1. Dr. A. R. Gopal-Ayengar, Head, Biology and Medical Divisions, Atomic Energy Establishment, Trombay, Bombay—Chairman; 2. Dr. D. M. Bose, Bose Institute, Calcutta; 3. Dr. N. N. Das Gupta, Professor of Biophysics, Saha Institute of Nuclear Physics, Calcutta University, Calcutta; 4. Dr. S. Korgaonkar, Head of the Department of Biophysics, Indian Cancer Research Centre, Bombay; 5. Dr. A. S. Paintal, Professor, Physiology Department, All India Institute of Medical Sciences, New Delhi; 6. Dr. G. N. Ramachandran, Professor of Physics, University of Madras, Madras.

The terms of reference of the National Committee will be as follows: (a) To promote international co-operation in biophysics. (b) To liaise with the international organisation of pure and applied biophysics and other organisations interested in biophysics, and generally to encourage and support international activities likely to contribute to the development of biophysics in any of its aspects.

All India Leprosy Workers Conference

The next Biennial Meeting of the Indian Association of Leprologists and the 8th All India Leprosy Workers Conference will be held at Hyderabad on January 4-8, 1962, in the Hyderabad Public School, Begumpet. The conference will be inaugurated by Shri Bhim Sen Sachar, Governor of Andhra Pradesh, and Chairman of the Hind Kusht Nivaran Sangh. Raj Kumari Amrit Kaur is expected to preside over the Conference. A reception committee has been formed with Shri P. V. G. Raju, Health Minister, Andhra Pradesh, as Chairman. The subjects to be discussed at the Conference will include the following: (1) A plan for eradication of leprosy from India, (2) Social aspects including rehabilitation, (3) Health education and publicity and (4) Miscellaneous. An Exhibition will be arranged at the site of the Conference.

Steroid Plant for Bombay

The foundation stone was recently laid of the new Steroid Plant in Bombay for Wyeth Laboratories Limited. The ceremony was performed by Mr. Frederick J. Cavanaugh, Vice-President, Wyeth International Ltd., U.S.A. and Mr. K. G. Maheshwari, Managing Director, Geoffrey Manners & Co. Ltd. and Director of Wyeth Laboratories Limited.

Health Survey and Planning Committee Proposals

The introduction of a system of graded charges for all hospital services, except in the case of the poor, the setting up of an All-India Health Service on the lines of the IAS and reorganisation of medical education have been recommended by the Health Survey and Planning Committee, it is learnt.

The committee, headed by Dr. A. Lakshmanaswami Mudaliar, was appointed two years ago to make an evaluation of developments in the field of health and medical services since independence and make recom-

mendations keeping in perspective the needs of the next 10 to 15 years.

In a comprehensive survey of all aspects of public health since the Bhore Committee reported 15 years ago, the Mudaliar Committee has suggested changes in the present policies and programmes designed to achieve a higher standard of health. The report, recently submitted to Government, embodies proposals relating to general aspects of public health, water supply and sanitation, nutrition, communicable diseases, professional education and research, population problems, drug control and administrative organisation.

The committee has expressed the view that it does not appear feasible for the State to provide free medical service on the scale visualised by the Bhore Committee in the near future. It should be considered fairly satisfactory if the ratio of one bed per 1,000 population is achieved during the next two or three plan periods.

Stating that the question of financing the medical care needs careful study, the committee favours a system of graded charges in hospitals except in the case of the 'genuinely indigent patients'. The possibility of the levy of a health cess is also worth exploring, according to the committee.

As part of its plan of reorganisation of health services, the committee has stressed the importance of strengthening the district hospitals.

The programme of primary health centres should be 'radically revised' and such centres should not be set up without adequate facilities, resources and personnel. It would be preferable, to provide medical coverage to rural population through mobile health vans visiting them from district and taluk hospitals than through 'poorly-equipped and staffed' primary health centres.

An inquiry into the cost structure of manufactured drugs has been suggested by the Committee.

The policy in respect of setting up pharmaceutical industries should be based on the need of the consumer rather than on the industrial policy of the Government. There should be close co-ordination between the drug control organisation and the development wing of the Commerce and Industry Ministry in regard to pharmaceutical projects.

The committee urged that in order to help the pharmaceutical industry and safeguard public health, no quarter should be given to anyone merely on the ground of his being a small-scale manufacturer.

National Health Service Urged

The need for establishing a national health service in the country as in the United Kingdom was referred to by Prime Minister Nehru when he laid the foundation-stone of a hospital-*cum*-nursing home in New Delhi to be named after the late Govind Ballabh Pant.

Mr. Nehru said such a service might not be possible immediately because of lack of adequate resources but the minimum that could be done was to provide basic hospital facilities for those who lived in villages.

The hospital, a Rs. 40-lakh project sponsored by the Delhi Administration, will have 350 beds now and will be later expanded to provide 500 beds.

Drug Factory for Hyderabad

A team of six Russian experts, headed by Mr. Valaschek, arrived at Hyderabad on November 3, 1961 from Delhi to finalise the details for the projected Rs. 15-crore synthetic drug factory at Sanatanagar. The factory programmes to produce all sulpha drugs, anti-tuberculosis drugs, vitamin preparations and all modern synthetic drugs. The factory is expected to go into production in 1964.

E.N.T. Hospital in Hyderabad

The Andhra Pradesh Government have directed that the Sarojini Devi Hospital, Hyderabad, be declared as a teaching and treatment hospital purely for eye diseases with a bed strength of 200. The Government is likely to take steps for the setting up of a separate hospital for ear, nose and throat diseases.

They have also directed the establishment of a separate department for E.N.T. diseases in the Osmania General Hospital, Hyderabad, and in the Gandhi Hospital, Secunderabad, to cater to the needs of the public of Hyderabad and Secunderabad respectively and for the clinical teaching of the students of the Osmania Medical College and Gandhi Medical College, Hyderabad.

Twenty-five beds in each of the Osmania General Hospital, and Gandhi Hospital, will be earmarked for the branch of E.N.T. disease.

Greater Incidence of TB, VD and 'Flu among Workers

The morbidity data collected by the Employees State Insurance Corporation shows that incidence of tuberculosis, VD and influenza has steadily risen among the working classes.

The incidence of influenza is steadily rising for the last three years—170 per thousand in 1958, 216 in 1959-60 and 229 in 1960-61.

The rate of tuberculosis rose from 11·5 per thousand to 12·6; dysentery from 163 to 182; arthritis and rheumatism from 177 to 189; gonococcal infections from 9·54 to 9·56; and syphilis from 6·41 to 6·86.

On the other hand, malaria has shown a steady decline with a rate of 101 in 1958-59, 87 in 1959-60 and 71 in 1960-61.

Assam has the highest incidence of all kinds of diseases. In most cases, the rate of sickness is higher than the all-India average.

As against Assam, the incidence of various types of diseases in Delhi is the lowest, though skin infections and arthritis and rheumatism show a higher rate than the all-India average.

Pharmaceutical Congress at Puri

The 14th Indian Pharmaceutical Congress will be held at Puri on the 29th, 30th and 31st December, 1961 under the presidentship of Dr. B. Mukerji, Director of Central Drug Research Institute, Lucknow. The reception committee is headed by Dr. S. K. Misra, Director of Health Service, Orissa. About 1,000 delegates are expected to attend the session from all parts of India. A few distinguished scientists from foreign countries are likely to attend.

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British Medical Journal, 1960, I, 1650.

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Clinical Endocrinology, 1960, I, 312.

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British J. Clin. Pract., 1961, 15, 41.

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K. N. Gour, M.D., F.R.C.P.E., F.R.F.P.S.G., D.C.H. (Eng.), D.P.H., **and Sudhir Gupta,** B.Sc., M.B.,B.S., D.C.H., *Current Medical Practice,* 1959, 3, 135.

D. J. Jussawalla, M.S., F.R.C.S. (E), F.I.C.S., *Journal of the Indian Medical Profession,* 1956, 10, 964.

K. C. Sahu, M.B.,B.S., D.P.H. (Eng.), D.C.H. (Lond.), D.T.M. & H. (Liverpool), F.D.S. (Lond.), *The Medical Digest,* 1954, 9, 485.

S. N. Ranade, B.Sc., M.B.,B.S., D.D.V., F.C. P. S. **and G. K. Raje,** M.B.,B.S., D.D.V., *The Antiseptic,* 1958, 2, 111.

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Medical Councils

Sir,—I claim no intuition on the subject, but am only venturing to jot down what I have gathered from my humble experience so that others may improve on or add to this by virtue of their better or bitter experience, in due course of time. History not only gives us facts and data but it gives us some lessons to build our future. Doomed is the nation or the community that only crams facts and data of history to rattle those out when demanded and then forgets about them without having any creative impression; and progressive is the State that learns lessons from the past to become wiser for the future. With this conviction I cite below an incident of recent happening.

The recognition of B.M.B.S. graduates of Ayurvedic Medicine, integrated with a tinge of Modern (Allopathic) Science, and their registration on par with the M.B.B.S. graduates of purely Modern Medicine by Uttar Pradesh State is an eye opener. It has given an indelible impression on my mind and a great food for thought. I have often brooded over the problem and have come to certain conclusions which I hereunder submit as suggestions for whatever worth those be.

Let us first briefly, without losing or distorting the true picture for brevity, go over the happenings that brought forth the recognition and registration as it ought not to be :

On 18th May 1961, the Government of Uttar Pradesh on grounds of paucity of qualified doctors in about 250 rural dispensaries wrote to the Director of Medical Health Services, U.P. to open the recruitment of P.M.S. II to B.M.B.S. graduates, by recognising them as registrable in U.P. Medical Council Act. The Director, being the Ex-officio President of the U.P. Medical Council, summoned an extraordinary meeting of the council for this sole purpose.

Before we go further, permit me to say that the B.M.B.S. is a degree of Ayurved, integrated with a tinge of Modern Medicine, awarded by the Lucknow University's Faculty of Medicine (Ancient and Modern) till 1956, and thereafter by the Faculty of Ayurved only due to certain amendments of 1956 and 1958. And as such, it naturally ought to be under the Board of Indian Medicine governed by the U.P. Indian Medicine Act 1939, and NOT under the purview of the U.P. Medical Council which latter, *vide* U.P. Medical Act of 1917, deals only with medical practitioners of allopathic medicine.

The usual procedure all over the country is that for the recognition of a qualification (degree or diploma) the Institute, Faculty or the University awarding the degree applies to the I.M.C. who after satisfying about the standards of examinations etc. recommend its inclusion in the schedules of the registrable and recognisable qualifications under I.M.C. ACT 1956, as amended to date. And in case a graduate seeks registration, the individual is required to apply and prove to the satisfaction of the State Medical Council one's merits for it, and registration is effected if the qualification is recognisable and the candidate has nothing against his moral, mental or ethical conduct; otherwise rejected. In the particular instance, the issue for the recognition of degree was not raised by the awarding institute or faculty. It was sought by an unconcerned third party, the U.P. Government; and the Medical Council has had no opportunity to scrutinise the standards of examination, etc. How the all-forceful Government came in the picture and how it contemplated to fill about 250 vacancies by these 18 odd B.M.B.S. graduates is beyond common man's comprehension.

Nevertheless, the Government's hand in keenly pursuing the issue is evident from the fact that though the Council meeting, in which it was passed by a very narrow margin after a heeated and prolonged discussion on the issue, ended as late as 2 P.M., the Government got the Governor's assent the same day and it saw the light of the day that very evening through the *U. P. Gazette*. I wonder if there is another example of such a quick procedure, passage and publication in the annals of the State Administration or Legislation! And to make matters worse, in that extreme hurry or haste or due to some other reason, there occurred glaring difference between the text of the resolution as hurriedly drafted and passed by the Council and that as notified in the Gazette the same evening.

The Gazette publication, however, as hinted above, dropped out the strings or the conditions attached by the Council resolution.

Needless to say, that this move has done a great disservice to the allopaths who are placed on par and alongside persons qualified on different lines and the recognition of whom is NOT accepted by the I.M.C. Act. This is apt to jeopardise chances of recognition of our degree by the Grand Medical Council. It has at the same hurt the pristine glory of Ayurved by creating an overt impression that its teaching essentially needs a cloak or seal of the Medical Council of Allopaths in order to consider its graduates fit for practice or service; and that their rightful registration under the Board of Indian Medicine has little value in the eyes of the U.P. Government. Further, it creates an invidious distinction between Ayurvaids, who obtain similar integrated training, from different Universities like Banaras, Gurkul Kangri, Tibia, Lucknow, Pilibhit etc.—out of which B.M.B.S. from Lucknow only is registrable and eligible to P.M.S. II, whereas all others such B.I.M.S., D.A.M.S., A.M.I.S., D.M.I.S. etc. etc. are all excluded from the field. It also brings down the status, standard and prestige of the U.P. Medical Register because in the very resolution wherein the Council recommends the B.M.B.S. registration in U.P. Register it simultaneously recommends their exclusion from All India Register and thereby unambiguously makes it overt that B.M.B.S. is not worth the registration on par with M.B.B.S. anywhere else but in U.P.

And finally, it serves no useful purpose to let loose on the public semi or ill-qualified graduates to practise modern medicine over which they have little claim; while they could render much better service to the humanity if they were to practise or were to be appointed in service to such dispensaries that are on Ayurvedic lines in which they are well versed and which they were pledged to revive. And for this nothing more than slight modification in service terms or administrative control was needed to meet the ends of the purpose.

As to the question of meeting shortage of medical men, besides slight alterations in service terms temporarily, there could be many a glorious way. I had ventured to submit some to the Government, a gist of which is so kindly published in the columns of the *J. Indian M. A.* (16th Sept. 61 issue, page 304).

If incidents, like acceptance of huddling together of heterogenous elements in a common register when separate Boards and Councils do exist for them, are taken lightly as merely passing events in the long history without taking serious notice of or learning lessons from, they are bound to make many a muddle in the building of our National-Health-Programme of which we are only entering the end phase of its beginning. One can easily palpate the mischief wrought by this move, and the impressions and lessons it gives are so glaring that it would be futile on my part to waste the valuable columns of the Journal in recapitulating or reproducing them. I would, therefore, submit the suggestions which I feel will prevent recurrence of such fallacious moves and may to some extent undo or minimise the likely harm done :—

(i) In a democratic country and more so in a Republic State, a wide-awake politically minded community MUST have full say in their own affairs. And, therefore, the Medical Council both in the States and at the Centre MUST be composed of more elected than the nominated members, headed by an elected President and office bearers, under the State patronage. Thus it would be in a true position to get stock of the needs and views of the medical community in right perspective, and would represent the class effectively, in the interest of the public, practitioners, and the patronising State.

(ii) Whenever a new legislation in a State Council is sought, it must take its guidance from the All-India-Body-Letters-Patent, so that the States and the Centre keep in consonance, rather than at variance. If, however, there is nothing in Letters-Patent Code of the Centre, the State ought to take its own decisions with at least 2/3rd or 3/4th majority, not by a narrow or bare majority. In case such a majority is not procured on a controvertible issue, the matter should either be referred to the Central Body or to the General Referendum of the Medical Community.

(iii) Any Code or principle already existing or accepted by any State which is clearly in contravention to the expressed Code laid down by the I.M.C. (Central Body) ought to be repelled or mended to bring it in general tune and harmony with the Centre.

(iv) a. There should be one All India Register of Allopathic Medical Practitioners, in a single schedule, including names of all registered practitioners under I.M.C. Act, arranged alphabetically and Statewise. And State Register should only be an extract of it. The State Register may, however, include certain names earlier on it when new registrations are sought and granted by the State, pending their inclusion in All India Register in due course.

b. Further, that this Register MUST be kept complete and uptodate, by deletion, addition or amendment slips as and when needed. Such slips should be available periodically—say annually in March. For this purpose, some sort of system such as periodical renewal (annual, biannual or triannual etc.) of Registered Medical Practitioners on nominal fee may be introduced. Such a nominal fee will be handy to cover at least a part of the extra cost likely to be incurred in bringing out uptodate slips. And periodical renewel will ensure check up of addresses, demises, retirement, entrants etc. and would avoid the confused state of affairs that exists when many a Register show names with address "unknown" or names of even those who long left the land.

(v) The power of I.M.C. be NOT LIMITED to mere checking or supervising the standards of examinations for certifying the suitability or otherwise of a degree for recognition as registrable, but it MUST have full authority to inspect and report on the Teaching Institute seeking recognition of its degree, in all respects regarding the standards and efficiency both in quality and quantity of students, staff, etc.

Those institutes that do not come upto the standard set on All India Basis MUST be debarred from awarding such degrees that are synonymous with or equivalent to recognised degree. In case, any such degrees have already been awarded the degree holders be ordered to add some such words in bracket (NR) "not recognised" or (SS) "sub-standard" after the degree letters.

(vi) The emoluments of all medical men ought to be fixed on an All India Basis, commensurate with the knowledge obtained and the length of time and money spent on education. At present there is no service the incumbents of which have to study so long, so hard and the education so expensive and yet they get so low emoluments. This missionary service should not be allowed to become mercenary, but its banner of morale must be kept high free from worries of feed and future.

Medical Councils made effective and efficient, and the I.M.A. and A.I.M.L.A. taken in confidence, there is no reason not to have Health-Programme par excellence, nation-wide.

I am, etc.

N. Tyagi, Major (R.)
Member, U.P. Medical Council

Dalip Bhavan
Muzaffarnagar

REVIEWS

Neoplastic Diseases at Various Sites, Volume III, **Cancer of the Rectum**—Edited by Cuthbert E. Dukes, O.B.E., M.D., M.SC., F.R.C.S.; 1960, E. & S. Livingstone Ltd., Edinburgh; 9½"×6½", pp. 304; 50sh. nett.

This monograph is an absolute 'must' for students, trainees and practising surgeons alike. A work by Dukes needs no fresh introduction.

A. K. ROY

Source Book of Medical History—Compiled with Notes by Logan Clendening, M.D.,; 1960, Dover Publications, Inc., 180 Varrick Street, New York 14, U.S.A.; 8"×5½", pp. xiv+685; $2·75 net.

The history of medicine is no doubt a very interesting subject for doctors, students and even laymen. The evolution of modern techniques in various branches of medicine from the days of Papyrus is certainly a subject of great interest to all.

Dr. Clendening, Professor of History of Medicine of the Kansas University, brings together in this valuable work significant writings of over 4,000 years. 124 papers of 120 authors are published in this volume.

Practically all branches of medicine are dealt with in a very precise manner; and as a short biography of each author is included in the work, it undoubtedly creates more interest for the reader.

Such an authoritative source book, we believe, is invaluable. It is indeed a notable publication.

SUKOMAL SEN

Radioisotope Studies of Fatty Acid Metabolism—By James F. Mead and David R. Howton; 1960, Pergamon Press, Oxford; 8½"×5½", pp. viii+141; 42 sh.

In physiology and biochemistry, the metabolism of fat and fatty acids is a vexed problem. The role of essential fatty acids and other less essential ones in the process of ageing and vascular degeneration is an important problem of the present day. With the advent of radioactive isotopes, synthesis or formation *in vivo* of long-chain fatty acids from 'acetates' has been partly clarified. But the process by which the unsaturated fatty acids are degraded is still unknown. This monograph presents befittingly, interesting topics regarding absorption, transport, deposition and mobilisation of fat as well as the turnover and metabolic influence. The chapters on biosynthesis of fatty acids in animals and plants, phospholipids biosynthesis and catabolism, and sterol esters are extremely interesting.

In appendices I and II, a very useful treatise has been presented on the preparations of labelled fatty acids and controlled degradation of labelled fatty acids. These are very useful chapters for every laboratory worker in radio-biochemistry. The volume will prove extremely useful to research workers.

S. R. MUKHERJEE

Modern Surgery for Nurses—Edited by F. Wilson Harlowe, M.B., F.R.C.S. (ENG.); 1961, William Heinemann Medical Books Ltd., London W1; 8½"×5½", pp. xxiv+883; 30 sh.

The book is an excellent guide for the student nurses both as text-book and reference work. Every chapter has been well illustrated. The volume, which is clear and concise in every detail, covers all aspects of surgical nursing. The work should also serve as a guide to senior tutors.

UMA SENGUPTA

Practical Birth Control Methods—By Abraham Stone, M.D. and Norman E. Himes, PH.D., English edition revised by Margaret C. N. Jackson, M.B.B.S., D'OBST, R.C.O.G., J.P.; Second edition, 1960, George Allen & Unwin Ltd., London; 8½"×5½", pp. xiv+208, with 208 illustrations; 21 sh. net.

This book was originally published in 1938 for the American readers. This new edition has been adapted by Dr. Jackson for British readers. It is divided into three parts, viz., social and legal aspects; medical aspects; and related problems. The appendix contains county clinic list, national organisations and books for adolescents and adults on sex education, family planning, etc.

The primary purpose in writing this book was to help individual members of the public and to assist them in finding a competent doctor willing to discuss problems relevant to the subject matter. Medical men will find the first chapter, which deals with the history of birth control from primitive peoples to the present day, very interesting. The second part of the book discusses the medical aspects and apparatus available for birth control. Vaginal diaphragms, cervical caps, chemical jellies, creams and suppositories, foams, douches, sponges, tampons and the safe period have been serially described and evaluated in terms of success or failure per hundred married couples.

The safe period has been described at length and the authors have quoted Ogino and Knaus that ovulation takes place two weeks before the onset of next menstruation. The basal temperature graph has also been discussed. The cervical glucose test is too uncertain to be of any value in determining the time of ovulation. The chapter on ineffective and harmful methods include withdrawal, holding back and various intrauterine devices. Experimental methods include the 'oral progestogen' method.

The third part of the book discusses the various aspects of abortion, such as abortion and its control, abortion and the law, illegal abortions, and Japanese experiment on legalisation of abortion. There are also discussions on infertility, the Rh factor, artificial insemination and adoption.

The authors have succeeded in presenting a comprehensive account of the practical aspects of birth control methods for the intelligent lay public. The get-up of the book is excellent.

J. DHAR

OBITUARY

Dr. Rochiram Asanand Amesur

Dr. Rochiram Asanand Amesur was born in humble surroundings at Karachi, on 25th September, 1885. He passed from Hyderabad (Sind) Medical School in 1906. After qualifying he joined Government Service, but resigned after four years to take up independent practice at Karachi. From his early days, he was devoted to public work. In 1906, he joined the All India Assistants Association (later on called as All India Medical Licentiates Association), which had just then been formed. He rendered active help to the Association and worked hard to improve the lot of the licentiates. He took active part in the conferences of the Association asd was made the first honorary treasurer at its annual session in Calcutta in 1919. The independence of the Licentiates Association was threatened at its Delhi Conference soon after the Jalianwala Bagh tragedy, as the then Viceroy Lord Chelmsford was invited as the chief guest, at Delhi Conference. As the Association was mainly composed of Government servants, this invitation gave a blow to the National Movement. As honorary treasurer, he attended the conference at the time when the Punjab was under Martial Law. He requested at the conference to be relieved of the post of honorary treasurer, and on his return from the conference to Karachi, he sent away all the papers, etc., to the then General Secretary, thus severing his connections with the All India Medical Licentiates Association.

DR. ROCHIRAM A. AMSEUR

In 1924 he decided to start the Karachi Medical Association with its membership open to all medical men with registrable qualifications. He held the post of the Secretary from its inception for about 15 years and then was its President. In 1928, All India Medical Conference was held at Calcutta, when All India Medical Association was formed. In 1930, the All India Medical Association changed its name to the Indian Medical Association. The Karachi Medical Association joined I.M.A. as its Sind Provincial Branch; since then Dr. Amesur played an important role in its growth.

He was elected as a member of the governing body and also a member of the Working Committee of the I.M.A. since its inception for many years. He became one of the joint secretaries of the Association in 1936, Vice-President in 1940-41, and was called upon to preside at the Patna Conference in April, 1943, thus becoming the President of Indian Medical Association for the year as per the rules of the Association. He was elected as the President of the I.M.A. in 1945-46 and presided at its Amritsar Session. He was nominated by the Central Government in 1943 to the Health Survey and Development (Bhore) Committee and was elected to its industrial subcommittee. He was elected by the I.M.A. on the Medical Benefit Council of the Employees State Insurance Corporation in 1948.

In 1931, he was elected in a Bye-Law election to the Bombay Medical Council. He was again elected to this Council for five years. In 1942, he was nominated by Sind Government to the Bombay Medical Council. When Sind Medical Council came into existence, he resigned from the Bombay Medical Council and was nominated on it as a representative of Indian Medical Association and continued upto 1948, when he had to migrate to India.

In 1924, he entered the Karachi Municipality and served as Municipal Councillor for 22 years. He was Chairman of the Standing Commitee and other committees and an elected member on Municipal School Board.

In 1942 he was elected to Sind Nurses Midwives and Health Visitors' Council as a representative of I.M.A. and was its President for two years.

From 1934 to 1947, he was member of Karachi Health Association. He was its President for seven years and Honorary Secretary for 14 years. He collected funds and built an upto date maternity home with 50 beds, with facilities of operations and antenatal and postnatal clinics attached to it. With domiciliary service extended through the Karachi Health Association this institution rendered real succour to the poor.

After partition Dr. Amesur left Karachi (Pakistan) and settled in Bombay, but he still continued to take active interest in the affairs of the Indian Medical Association.

He died as the result of a head injury sustained in an accident, on 30th August, 1961. He was aged 76.

He is survived by his wife, four sons of whom Dr. Nirmal Chandra is a Surgeon at Willingdon Hospital, New Delhi, and his brother Dr. C. A. Amesur.

SUPPLEMENT
Journal of the Indian Medical Association

VOL. 37, NO. 12 CALCUTTA DECEMBER 16, 1961

ASSOCIATION NOTES

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Gujarat, Saurashtra and Kutch Terr. Branch (Total Rs. 7,780·04): Dr. A. P. Shukla (Ahmedabad) Rs. 90·38; Dr. I. M. Bhatt (Junagadh) Rs. 25·00; Dr. N. J. Dhruv (Nunagadh) Rs. 25·00; Dr. H. J. Nansay (Jamnagar) Rs. 626·58; Dr. S. B. Anklesaria (Ahmedabad) Rs. 51·00; Dr. K. M. Majuthia (Bhavnagar) Rs. 50·00; Dr. A. R. Trivedi (Godhra) Rs. 25·00; Dr. N. G. Shah (G. & Saurashtra) Rs. 25·00; Dr. K. H. Haradhwala (Surat) Rs. 25·00; Dr. S. P. Bhacca (Surat) Rs. 151·00; Dr. R. M. Vakharia (Broach) Rs. 100·00, Members of Junagadh Branch Rs. 250·00; Members of Dohad Branch Rs. 90·00; Members of Jambusar Branch Rs. 51·00; Members of Amreli Branch Rs. 175·00; Member of Kutch Branch Rs. 10·00; Members of Bhavnagar Branch Rs. 250·00; Members of Gondal Branch Rs. 101·00; Members of Jamnagar Branch Rs. 501·00; Members of Kadi Kalol Branch Rs. 151·00; Members of Morvi Branch Rs. 201·00; Members of Palampur Branch Rs. 30·00; Members of Rajkot Branch Rs. 641·00; Members of Surendranagar Branch Rs. 250·00; Members of Branches formerly under Kutch Terr. Branch Rs. 270·00; Dohad Branch Rs. 90·00; Dhoraji Branch Rs. 50·00; G. S. Terr. Branch Rs. 928·00; G. S. & Kutch Terr. Branch Rs. 2,500·00; Dr. M. J. Shah (Ahmedabad) Rs. 47·08.

Kerala State Branch (Total Rs. 7,808·42): Dr. C. O. Karunakaran (Trivandrum) Rs. 315·00; Dr. S. S. Rao (Cochin) Rs. 1,002·42; Dr. K. Damodaran (Mavelikara) Rs. 50·00; Dr. J. T. Edwin (Trivandrum) Rs. 25·00; Dr. C. K. Menon (Malabar) Rs. 50·00; Dr. P. Balaram (Malabar) Rs. 50·00; Dr. T. Balkrishnan (Malabar) Rs. 1,020·00; Dr. K. R. Pillai (Trivandrum) Rs. 100·00; Dr. R. R. Pillai (Trivandrum) Rs. 100·00; Dr. K.

Ponnamma (Trivandrum) Rs. 100·00; Dr. R. K. K. Thampan (Trivandrum) Rs. 100·00; Dr. K. B. Menon (Trivandrum) Rs. 50·00; Dr. S. S. Pillai (Trivandrum) Rs. 50·00; Dr. (Miss) O. Mathai (Trivandrum) Rs. 50·00; Dr. I. Z. Thomas (Trivandrum) Rs. 45·00; Dr. K. G. Thankamma (Trivandrum) Rs. 25·00; Dr. N. R. S. Nair (Trivandrum) Rs. 25·00; Dr. (Miss) E. Samuel (Trivandrum) Rs. 100·00; Dr. B. M. Ambadi (Trivandrum) Rs. 100·00; Dr. R. K. Nair (Trivandrum) Rs. 100·00; Dr. Raman Nair (Trivandrum) Rs. 50·00; Dr. K. Thampi (Trivandrum) Rs. 50·00; Dr. A. Shankarnarayan (Trivandrum) Rs. 40·00; Dr. K. M. Nair (Trivandrum) Rs. 100·00; Dr. K. R. Iyyar (Trivandrum) Rs. 50·00; Dr. P. K. Kutty (Trivandrum) Rs. 50·00; Dr. M. Sukumaran (Trivandrum) Rs. 25·00; Dr. C. M. Francis (Trivandrum) Rs. 25·00; Dr. S. R. Gurjar (Cochin) Rs. 50·00; Dr. S. Govindan (Kozhikode) Rs. 100·00 Dr. E. K. R. Pillai (Quilon) Rs. 25·00; Dr. A. Chandi (Quilon) Rs. 25·00; Dr. V. Krishnan (Quilon) Rs. 25·00; Dr. K. Rajgopalan (Quilon) Rs. 25·00; Dr. K. K. Titus (Quilon) Rs. 25·00; Dr. K. Sumitra (Quilon) Rs. 25·00; Dr. P. N. Narayan (Quilon) Rs. 25·00; Dr. Luke Varghese (Quilon) Rs. 25·00; Dr. (Mrs.) Varghese (Quilon) Rs. 25·00; Dr. A. G. Chacko (Quilon) Rs. 25·00; Dr. K. Varghese (Trivandrum) Rs. 25·00; Dr. C. A. Achuthan Pillai (Trivandrum) Rs. 100·00 Dr. C. K. Shankaran (Malabar) Rs. 101·00; Members of Kottayam Branch Rs. 265·00; Members of Mavelikara Branch Rs. 145·00; Members of Trivandrum Branch Rs. 30·00; Members of Palghat Branch Rs. 665·00; Member of Kozhikode Branch Rs. 10·00; Members of Malabar Branch Rs. 430·00; Members of Alwaye Parur Branch Rs. 100·00; Members of North Malabar Branch Rs. 300·00; Members of Cochin Branch Rs. 130·00; Kottayam Branch Rs. 250·00; Alleppy Branch Rs. 500·00; Quilon Branch Rs. 280·00; Mavelikara Branch Rs. 130·00; Trivandrum Branch Rs. 100·00.

Madhya Pradesh State Branch (Total Rs. 3,062·00): Dr. R. Singh (Jabalpur) Rs. 50·00; Dr. B. G. Patel (Indore) Rs. 25·00; Dr. Kurt Bergter (Raipur) Rs. 50·00; Dr. N. M. Sawant (Ujjain) Rs. 100·00; Dr. S. J. Mukherjee (Indore) Rs. 150·00; Dr. V. D. Munghee (Ujjain) Rs. 50·00; Members of Indore Branch Rs. 130·00; Members of Ujjain Branch Rs. 61·00; Member of Mhow Branch Rs. 5·00; Members of Ratlam Branch Rs. 114·00; Members of Raipur Branch Rs. 180·00; Indore Branch Rs. 349·00; Mandsaur Branch Rs. 165·00; Mhow Branch Rs. 125·00; Panna Branch Rs. 51·00; Jabalpur Branch Rs. 301·00; Satna Branch Rs. 101·00; Raipur Branch Rs. 55·00; Dr. N. M. Savant (Ujjain) Rs. 1,000·00.

Madras State Branch (Total Rs. 10,686·00): Dr. U. Krishna Rau (Madras) Rs. 1,043·25; Dr. B. Rama Murthy (Madras) Rs. 251·00; Dr. M. Saguna Bai (Madras) Rs. 25·00; Dr. A. V. Sevaram (Madras) Rs. 75·00; Dr. K. V. Swamy (Madras) Rs. 101·00; Dr. K. R. Doraiswamy (Madras) Rs. 250·00; Dr. K. G. Ramchandran (Madurai) Rs. 25·00; Dr. T. S. Subramanian (Trichurapally) Rs. 101·00; Dr. N. Jagannathan (Coimbatore) Rs. 1,000·00; Dr. T. V. Sivanandam (Coimbatore) Rs. 1,000·00; Dr. P. G. K. Menon (Nilgiris) Rs. 50·00; Dr. N. Kappinipathy (Nilgiris) Rs. 40·00; Dr. A. Devraj (Nilgiris) Rs. 25·00; Dr. K. R. Hariharan (Salem) Rs. 100·00! Dr. R. N. Sujir (Salem) Rs. 49·75; Dr. S. Veleswaran (Salem) Rs. 100·00 Dr. Y. P. Vasudevan (Coimbatore) Rs. 269·00; Dr. K. R. Venkiteswaralu (Coimbatore) Rs. 101·00; Dr. S. Ganapathy (Coimbatore) Rs. 100·00; Dr. V. S. Krishnaswamy (Coimbatore) Rs. 25·00; Dr. L. K. Muthuswamy (Erode) Rs. 25·00; Dr. B. S. Viswanathan (Erode) Rs. 25·00; Dr. Rajaratnam (Coimbatore) Rs. 250·00; Dr. R. S. Rao (Coimbatore) Rs. 1,000·00; Dr. A. G. Leelakrishnan (Coimbatore) Rs. 101·00; Dr. K. Ananta Rao (Coimbatore) Rs. Rs. 100·00; Dr. K. Tiruchitrambalam (Coimbatore(Rs. 100·00; Dr. A. Rajagopalan (Coimbatore) Rs. 25·00; Dr. V. Sreeramalu (Coimbatore) Rs. 200·00; Dr. R. A. Rahman (Coimbatore) Rs. 200·00; Dr. (Mrs.) R. Saradambal (Coimbatore) Rs. 100·00; Dr. (Mrs.) K. Kabir (non-member Tirunelveli) Rs. 10·00; Members of Salem Branch Rs. 170·00; Members of Tirunelveli Branch Rs. 290·00; Members of Nilgiris Branch Rs. 235·00; Members of Erode Branch Rs. 65·00 Members of Annamalais Branch Rs. 168·00; Members of Tanjore Branch Rs. 595·00; Member of Trichurapally Branch Rs. 10·00; Member of Madras Branch (Dr. R. Rajamanickam) Rs. 10·00; Dr. Alagasingari Naidu (Madras) Rs. 150·00; Dr. U. L. Narayan Rao (Madras) Rs. 1,000·00; Dr. Sriramalu (Madras) Rs. 51·00; Dr. D. R. Varman (Madras) Rs. 25·00; Member of Madurai Branch Rs. 10·00; Members of Chinglepat Branch Rs. 70·00; Madurai Branch Rs. 770·00; Dr. M. Mathias (Nagercoil) Rs. 100·00 Dr. M. Gopala Pillai (Nagercoil) Rs. 50·00; Dr. M. R. Morris (Nagercoil) Rs. 25·00; Dr. S. G. Fletcher (Nagercoil) Rs. 25·00.

Maharashtra Terr. Branch (Total Rs. 12,082·23): Dr. G. Sahu (Nagpur) Rs. 100·00; Dr. D. J. Athawale (Jalgaon) Rs. 51·00; Dr. S. V. Sahasrabudhe (Jalgaon) Rs. 51·00; Dr. B. K. Modak (Kalyan) Rs. 50·00; Dr. P. D. Mahalekar (Kalyan) Rs. 25·00; Dr. K. V. Kelkar (Kolhapur) Rs. 250·00; Dr. V. R. Srikhande (Kolhapur) Rs. 101·00; Dr. D. S. Khatri (Nasik) Rs. 101·00; Dr. H. S. Joshi (Nasik) Rs. 51·00; Dr. (Mrs.) I. Joshi (Nasik) Rs. 51·00; Dr. D. V. Kulkarni (Nasik) Rs. 51·00; Dr. (Miss) D'Souza (Nasik) Rs. 36·00; Dr. R. V. Kelkar (Nasik) Rs. 51·00; Dr. B. P. Gupta (Nasik) Rs. 101·00; Dr. T. S. Gupta (Nasik) Rs. 101·00; Dr. D. V. Mulay (Sholapur) Rs. 1,102·00; Dr. (Mrs.) Diwadkar (Sholapur) Rs. 102·00; Dr. M. S. Muley (Sholapur) Rs. 101·00; Dr. (Mrs.) Parachure (Sholapur) Rs. 51·00; Dr. R. S. Govaikar (Sholapur) Rs. 51·00; Dr. V. D. Telang (Sholapur) Rs. 51·00; Dr. M. A. Prabhu (Sholapur) Rs. 51·00; Dr. K. S. Raje (Sholapur) Rs. 45·00; Dr. M. N. Vaidya (Sholapur) Rs. 50·00; Dr. N. K. Desai (Sholapur) Rs. 25·00; Dr. N. D. Sone (Sholapur) Rs. 25·00; Dr. V. P. Aroskar (Sholapur) Rs. 25·00; Dr. D. M. Palkar (Nagpur) Rs. 100·00; Dr. G. K. Gan (Nagpur) Rs. 500·00; Dr. P. N. Pradhan (Nagpur) Rs. 200·00; Dr. R. M. Dange (Nagpur) Rs. 500·00; Dr. (Mrs.) S. Balraj (Nagpur) Rs. 231·00; Dr. R. N. Choudhuri (Akola) Rs. 250·00; Dr. S. Gaya Prasad (Nagpur) Rs. 101·00; Dr. K. V. Bhavapurkar (Nagpur) Rs. 51·00; Dr. (Mrs.) S. V. Bhivali (Nagpur) Rs. 25·00; Dr. G. V. Pandit (Yeotmal) Rs. 50·00; Dr. R. N. Dhamdheri (Poona) Rs. 50·00; Dr. Y. M. Donde (Murtizapur) Rs. 50·00 Dr. S. L. Dhani (Murtizapur) Rs. 50·00; Dr. B. P. Sharma (Murtizapur) Rs. 50·00; Dr. R. N. Joshi (Murtizapur) Rs. 50·00; Dr. U. G. Masurkar (Ahmednagar) Rs. 41·00; Dr. E. G. Tainla (Nagpur) Rs. 40·00; Dr. (Major) A. P. W. Da'Costa (Nagpur) Rs. 30·00; Dr. M. R. Kelkar (Kurudwadi) Rs. 25·00; Dr. V. G. Desai (Kurudwadi) Rs. 25·00; Dr. Bhanappa (Maharashtra) Rs. 10·00; Member of Kurudwadi Branch Rs. 20·00; Members of Ratnagiri Branch Rs. 25·00; Members of Nasik Branch Rs. 43·00; Members of Sholapur Branch Rs. 206·00; Members of Murtizapur Branch Rs. 20·00; Member of Ahmednagar Branch Rs. 10·00; Members of Khamgaon Branch Rs. 84·00; Member of Yeotmal Branch Rs. 4·00; The Hony. Secretary, Sangamner Branch Rs. 51·00; Buldana Branch Rs. 95·00; Poona Branch Rs. 250·00; Miraj Branch Rs. 101·00; Malegaon Branch (Nasik) Rs. 101·00; Barsi Branch Rs. 330·00; Nagpur Branch Rs. 433·00; Deolali Branch Rs. 50·00; Jalgaon Branch Rs. 102·00; Kolhapur Branch Rs. 25·00; Sholapur Branch Rs. 1,083·00; Maharashtra Terr. Branch Rs. 1,000·00; Maharashtra Provincial Council Rs. 1,000·00; Dr. S. V. Deodhar (Nasik) Rs. 10·00; Dr. M. P. Bawle (Sholapur) Rs. 65·73; Dr. S. G. Chitre (Jalgaon) Rs. 51·00 Dr. C. N. Vyas (Jalgaon) Rs. 51·00; Dr. J. M. Gole (Poona) Rs. 50·00; Dr. Hari Pal (Kalyan) Rs. 25·00; Dr. S. K. Chitre (Kalyan) Rs. 25·00; Dr. V. B. Davalbhakta (Jalgaon) Rs. 251·00; Dr. M. H. Barode (Jalgaon) Rs. 25·00; Dr. P. G. Kulkarni (Jalgaon) Rs. 51·00; Dr. D. R. Patwardhan (Kalyan) Rs. 101·00; Members of Kalyan Branch Rs. 326·00; Members of Jalgaon Branch Rs. 151·00; Ulhasnagar Branch Rs. 37·50; Dr. R. N. Dange (Nagpur) Rs. 500·00; Members of Nasik Branch Rs. 50·00.

Mysore State Branch (*Total Rs. 5,420·00*) : Dr. C. V. Natrajan (Bangalore) Rs. 100·00; Dr. D. P. Jayaram (Bangalore) Rs. 50·00; Dr. (Miss) V. Kamalamma (Bangalore) Rs. 50·00; Dr. (Mrs.) Sita Bhateja (Bangalore) Rs. 30·00; Dr. D. K. N. Rao (Bangalore) Rs. 50·00; Dr. (Capt.) V. Seeha (Bellary) Rs. 25·00; Dr. U. K. L. Narayan Rao (Bellary) Rs. 25·00; Dr. B. H. Kalyani Bai (Hassan) Rs. 50·00; Dr. M. C. Nanjappa (Davangere) Rs. 50·00; Dr. M. S. Kallanpurkar (Davangere) Rs. 50·00; Dr. S. S. Kulkarni (Gadag) Rs. 26·00; Dr. G. V. Joshi (Hubli) Rs. 150·00; Dr. V. S. Viswanathan (Bangalore) Rs. 1,000·00; Dr. M. S. Wagle (Bangalore) Rs. 500·00; Dr. M. A. Hafeez (Bangalore) Rs. 50·00; Dr. M. C. Marulappa (Chitradurga) Rs. 50·00; Dr. R. S. Jirge (Belgaum) Rs. 251·00; Dr. S. W. Khote (Belgaum) Rs. 102·00; Dr. V. R. Gindc (Belgaum) Rs. 101·00; Dr. K. B. Kamat (Belgaum) Rs. 101·00; Dr. M. F. D'Silva (Belgaum) Rs. 51·00; Dr. S. K. Gokhale (Belgaum) Rs. 51·00; Dr. F. A. Hafeez (Belgaum) Rs. 51·00; Dr. Hukuri (Belgaum) Rs. 51·00; Dr. A. S. Jagdale (Belgaum) Rs. 51·00; Dr. N. R. Kulkarni (Belgaum) Rs. 51·00; Dr. V. R. Koppikar (Belgaum) Rs. 51·00; Dr. V. K. Kamat (Belgaum) Rs. 51·00; Dr. B. K. Kamat (Belgaum) Rs. 51·00; Dr. A. F. Merchant (Belgaum) Rs. 51·00; Dr. G. S. Murti (Belgaum) Rs. 51·00; Dr. D. G. Nayak (Belgaum) Rs. 51·00; Dr. G. B. Potdar (Belgaum) Rs. 51·00; Dr. N. S. Potdar (Belgaum) Rs. 51·00; Dr. B. V. Ramarao (Belgaum) Rs. 51·00; Dr. B. B. Prabhu (Belgaum) Rs. 51·00; Dr. S. V. Suthankar (Belgaum) Rs. 51·00; Dr. A. J. N. D'Souza (Belgaum) Rs. 25·00; Dr. M. R. Pusalkar (Belgaum) Rs. 25·00; Dr. A. K. Sathe (Belgaum) Rs. 25·00; Dr. Shravage (Belgaum) Rs. 25·00; Dr. H. R. Tergundi (Belgaum) Rs. 25·00; Dr. S. D. Vaidya (Belgaum) Rs. 25·00; Dr. A. G. Yalgi (Belgaum) Rs. 25·00; Dr. M. G. Hanamshet (Belgaum) Rs. 101·00; Dr. (Capt.) Mrs. D. Sommar (Belgaum) Rs. 101·00; Members of Hubli Branch Rs. 333·00; Members of Gadag Branch Rs. 100·00; Members of Bijapur Branch Rs. 100·00; Members of Belgaum Branch Rs. 50·00; Gadag Branch Rs. 151·00; Shimoga Branch Rs. 448·50; South Kanara Branch Rs. 72·50; Dharwar Branch Rs. 110·00.

Orissa State Branch (*Total Rs. 767·00*) : Dr. S. B. Palit (Berhampore) Rs. 50·00; Members of Cuttack Branch Rs. 50·00; Member of Balasore Branch Rs. 5·00; Member of Berhampore Branch Rs. 12·00; The Hony. Secretary, Rourkela Branch Rs. 150·00; Sundergarh Branch Rs. 500·00.

Punjab State Branch (*Total Rs. 3,698·09*) : Dr. R. S. Bhalla (Batala) Rs. 25·00; Dr. B. D. Agrawal (Jullundur) Rs. 250·00; Dr. B. K. Kapur (Ludhiana) Rs. 349·22; Dr. U. C. Ahuja (Ludhiana) Rs. 101·00; Dr. S. S. Satiza (Ludhiana) Rs. 151·00; Dr. Chabil Das (Ludhiana) Rs. 124·50; Dr. M. S. Satija (Ludhiana) Rs. 51·00; Dr. C. L. Syal (Ludhiana) Rs. 51·00 Dr. Harisingh Satija (Ludhiana) Rs. 151·00; Dr. R. S. Satija (Ludhiana) Rs. 101·00; Dr. V. N. Satija (Ludhiana) Rs. 25·00; Dr. D. N. Kohili (Ludhiana) Rs. 51·00; Dr. Gujjarmal Verma (Ludhiana) Rs. 1,001·00; Dr. N. S. Prahak (Ludhiana) Rs. 51·00 Dr. K. L. Pathak (Ludhiana(Rs. 150·00; Dr. Bachhansingh Grewal (Ludhiana) Rs. 51·00 Dr. P. Singh (Faridkot) Rs. 100·00; Direct Member of Punjab State Branch Rs. 10·00; Members of Fazalika Branch Rs. 10·00; Members of Ludhiana Branch Rs. 30·00; Member of Simla Branch Rs. 10·50; Members of Batala Branch Rs. 182·00; Members of Hoshiarpur Branch Rs. 100·00; Members of Punjab State Branch Rs. 105·00; Punjab State Branch Rs. 266·87; Members of Nawanshehar Doaba Branch Rs. 200·00.

Rajasthan State Branch (*Total Rs. 3,892·00*) : Dr. B. M. Kothary (Alwar) Rs. 51·00; Dr. (Mrs.) Tara Mathur (Alwar) Rs. 51·00; Dr. C. M. Sharma (Alwar) Rs. 41·00; Dr. P. N. Mathur (Alwar) Rs. 25·00; Dr. Sheila Mathur (Alwar) Rs. 25·00; Dr. R. L. Gupta (Alwar) Rs. 25·00; Dr. A. N. Sharma (Alwar) Rs. 25·00; Dr. Mahesh Narain Mathur (Alwar) Rs. 25·00; Dr. B. S. Mathur (Kotah) Rs. 25·00; Dr. C. V. Vasdeva (Kotah) Rs. 25·00; Dr. Jai Prakash (Kotah) Rs. 51·00; Dr. M. S. Jantu (Kotah) Rs. 51·00; Dr. P. L. Rishi (Kotah) Rs. 101·00; Dr. Pyarelal Gupta (Pilani) Rs. 51·00; Dr. S. V. Singh (Kotah) Rs. 101·00; Members of Alwar Branch Rs. 138·00; Member of Bikaner Branch Rs. 11·00; Members of Pratapgarh Branch Rs. 180·00; Members of Jaipur Branch Rs. 538·00; Members of Jhalawar Branch Rs. 120·00; Member of Jalore Branch Rs. 10·00; Members of Jodhpur Branch Rs. 357·00; Members of Udaipur Branch Rs. 220·00; Dholpur Branch Rs. 110·00; Jaipur Medical Association Rs. 1,500·00; Member of Ratangarh Branch Rs. 10·00; Dr. T. N. Bhargava (Alwar) Rs. 25·00.

Uttar Pradesh State Branch (*Total Rs. 19,132·21*) : Dr. S. N. Mukherjee (Varanasi) Rs. 187·87; Dr. S. Lahiri (Varanasi) Rs. 101·00; Dr. S. K. Chaudhuri (Varanasi) Rs. 50·00; Dr. M. M. S. Siddhu (Lucknow) Rs. 128·50; Dr. B. B. Bhatia (Lucknow) Rs. 1,000·00; Dr. B. D. Wadhava (Varanasi) Rs. 51·00; Dr. B. N. Sinha (Varanasi) Rs. 1,001·00; Dr. B. N. Bhalla (Kanpur) Rs. 251·00; Dr. C. B. Singh (Kanpur) Rs. 251·00; Dr. D. N. Tripathi (Moradabad) Rs. 101·00; Dr. H. S. Pant (Moradabad) Rs. 101·00; Dr. Hans Raj (Moradabad) Rs. 101·00; Dr. Hari Singh (Dehradun) Rs. 25·00; Dr. J. S. Agarwal (Moradabad) Rs. 1,000·00; Dr. J. S. Rastogi (Moradabad) Rs. 100·00; Dr. K. B. Dikshit (Moradabad) Rs. 100·00; Dr. K. K. Mathur (Dehradun) Rs. 25·00; Dr. M. A. Nomani (Varanasi) Rs. 1,000·0·0; Dr. R. P. Hajela (Dehradun) Rs. 25·00; Dr. Rammurti (Dehradun) Rs. 50·00; Dr. S. Kumar (Moradabad) Rs. 101·00; Dr. S. S. Misra (Lucknow) Rs. 1,000·00; Dr. R. V. Singh (Lucknow) Rs. 251·00; Dr. B. Mukherjee (Lucknow) Rs. 101·00; Dr. Tarachand (Lucknow) Rs. 51·00; Dr. Sunderlal Vij (Bijnore) Rs. 30·00; Dr. R. N. Tandon (Lucknow) Rs. 251·00; Dr. (Miss) A. D. Engineer (Lucknow) Rs. 101·00; Dr. G. N. Srivastava (Lucknow) Rs. 51·00, Dr. (Miss) C. Rohatgi (Kanpur) Rs. 250·00; Dr. (Mrs.) Premilla Gokhale (Kanpur) Rs. 51·00; Dr. (Miss) K. Sunandabai (Kanpur) Rs. 101·00; Dr. R. N. Bajaj (Kanpur) Rs. 25·00 Dr. K. Atkins (Kanpur) Rs. 25·00; Dr. C. L. Goswami (Kanpur) Rs. 25·00; Dr. C. M. Aga (Bareilly) Rs. 200·00; Dr. B. N. Khanna (Kanpur) Rs. 270·00; Dr. Bholanath (Varanasi) Rs. 250·00; Dr. (Miss) B. Thungamma (Varanasi) Rs. 1,001·00; Dr. K. N. Gaur (Kanpur) Rs. 51·00; Dr. D. R. Yadava (Lucknow) Rs. 51·00; Dr. (Mrs.) C. H. Lal (Farrukhabad) Rs. 1,001·00; Dr. L. H. Vischer (Farrukhabad) Rs. 51·00; Dr. S. D. Hajela (Farrukhabad) Rs. 51·00; Dr. B. S. Mehta (Varanasi) Rs. 662·84; Dr. R. C. Gupta (Direct Member U. P. State) Rs. 50·00; Dr. K. Sen Roy (Lucknow) Rs. 70·00; Members of Deoband Branch Rs. 40·00; Members of Bulandhhahar Branch Rs. 230·00 Members of Moradabad Branch Rs. 125·00; Members of Bijnore Branch Rs. 85·00; Members of Budaun Branch Rs. 48·00; Members of Kanpur Branch Rs. 235·00; Members of Deoria Branch Rs. 70·00 Members of Pilibhit Branch Rs. 51·00; 5 members of Mirzapur Branch Rs. 50·00; Member of Lucknow Branch Rs. 11·00; Members of Dehradun Branch Rs. 85·00; Members of Muzaffarnagar Branch Rs. 100·00; Members of Allahabad Branch Rs. 320·00; Dr. J. S. Kothiwal (Moradabad) Rs. 101·00; Dr. Harnam Singh (Moradabad) Rs. 50·00; Dr. G. Mujtaba (Moradabad) Rs. 50·00; Dr. S. K. Das (Moradabad) Rs. 25.00; Members of Farrukhabad Branch cum Fatehgarh Branch Rs. 95·00; Members of Bareilly Branch Rs. 1,000·00 Members of Pratapgarh Branch Rs. 150·00; The Hony. Secy. Dehradun Branch Rs. 101·00; The Hony. Secy., Faizabad Branch Rs. 10·00; Basti Branch Rs. 63·00; Bulandshahar Branch Rs. 10·00; Bijnore Branch Rs. 15·00 Faizabad Branch Rs. 190·00; Bahraich Branch Rs. 51·00; Gorakhpur Branch Rs. 250·00; Kanpur Branch Rs. 100·00; Mirzapur Branch Rs. 40·00; Ghaziabad Branch Rs. 50·00; Allahabad Branch Rs. 80·00; Aligarh Branch Rs. 100·00; From Reserve Fund of Budaun Branch Rs. 52·00; Members of Staff of Gandhi Eye Hospital, Aligarh Rs. 50·00; Anonymous (through Banaras State Bank, Banaras) Rs. 60·00; Anonymous

through Varanasi Branch Rs. 40·00; Reserve Fund Moradabad Branch Rs. 100·00; Dr. Navin Chandra (Kanpur) Rs. 50·00; Dr. Shanti Prakash Gupta (Lucknow) Rs. 50·00; Dr. K. N. Tandon (Fatehgarh) Rs. 25·00; Dr. J. L. Rohatgi (Kanpur) Rs. 1,001·00; Dr. (Mrs.) C. Rohatgi (Kanpur) Rs. 751·00; Dr. R. N. Bagley (Saharanpur) Rs. 1,100·00; Members of Amroha Branch Rs. 100·00.

Pharmaceutical Concerns (*Total Rs. 40,953·00*) : M/s. Alembic Chemicals, Baroda Rs. 10,000·00; M/s. Capco Ltd., Bombay (M/SR. Merck) Rs. 5,000·00; M/s. Ciba Pharma Ltd., Bombay Rs. 5,000·00; M/s. British Drug House (I) Ltd., Bombay As. 2,500·00; M/s. Glaxo Lab. (I) Ltd., Bombay Rs. 2,500·00; M/s. Gluconate Ltd., Calcutta Rs. 101·00; M/s. Parke Davis & Co. Ltd., Bombay Rs. 2,500·00; M/s. Bengal Chemical and Pharmaceutical Works, Calcutta Rs. 1,000·00; M/s. Standard Pharmaceutical Works, Calcutta Rs. 350·00; M/s. Dumex Private Lt., Bombay Rs. 500·00; M/s. Hoechst Fedco Pharma Ltd., Bombay Rs. 1,001·00; M/s. W. T. Suren & Co. P. Ltd. and M/s. Teddington Chemical Factory (P) Ltd., Bombay (joint contribution) Rs. 2,500·00; M/s. Imperial Chemical Industries, Calcutta Rs. 5,000·00; M/s. Oriental Chemical Works (P) Ltd., Calcutta Rs. 501·00; M/s. Calcutta Chemical (P) Ltd., Calcutta Rs. 500·00; M/s. East India Pharmaceutical Works, Calcutta Rs. 2,000·00.

Miscellaneous Receipts (*Total Rs. 7,142·94*) : Dr. (Km.) G. Hadhkar Rs. 50·00; Dr. P. N. Ray (Nawabganj) Rs. 5·00; Dr. K. G. Krishna Rao (Ghdiyattam) Rs. 10·00; Dr. V. Mahadevan (Devasbole) Rs. 10·00; Dr. J. V. Narurkar (Villupuram) Rs. 10·00; Dr. Vaishan Payan (Baran) Rs. 51·00; 30th All India Med. Conf., Hyderabad Rs. 3,000·00; Members of the W.C. & C.C., I.M.A. who attended annual meeting at Jaipur, December, 1955, Rs. 3,006·94; 31st All India Med. Conf., Lucknow Rs. 500·00; 15th Bihar State Medical Conference (Purnea) Rs. 500·00.

Total Rs. 2,49,517·30 nP.

SUPPLEMENTARY LIST OF DONORS TO THE BUILDING FUND OF THE I.M.A. FROM 1-8-61 TO 30-9-61.

1.	Dr. J. N. Bahadur (Delhi) ...	Rs. 25·00
2.	Dr. T. V. R. Sharma (Hyderabad) ...	Rs. 25·00
3.	Dr. S. C. Sen (Delhi) ...	Rc. 40·69
	Total ...	**Rs. 90·69**

BRANCH NOTES

AMRELI BRANCH—A monthly meeting was held at the residence of Dr. K. K. Shah, D.M.O. Dr. Joshi presided. Dr. Keshavlal Shah spoke on Tetanus in details. All the members present also discussed about their experiences as regards the treatment.

A regular programme for the whole year for the clinical meetings was arranged.

At the annual general meeting of the branch presided over by Dr. N. V. Adalja, retiring President, the following were elected as office-bearers for 1961-62 : President—Dr. Jayant R. Joshi; Vice-President—Dr. K. K. Shah; Secretary—Dr. Mahesh S. Bhatt; Representative to the Central Council—Dr. M. S. Bhatt; Representative to Territorial Council—Dr. N. V. Adalja.

ARARIA BRANCH—The annual general meeting of the branch was held on 13-11-61 at the residence of Dr. S. Lall. Dr. L. M. Kundoo was in the chair. The following office-bearers were elected unanimously : President—Dr. L. M. Kundo; Vice-President—Dr. Mrs. L. P. Mookerjee; Hony. Secretary—Dr. T. N. Saha; Asst. Secretary—Dr. M. Siddique; Auditor—Dr. S. P. Chatterjee.

BERHAMPORE (WEST BENGAL) BRANCH—The annual general meeting was held on 1-10-61. The annual reports and accounts were adopted. Office-bearers for the year 1961-62 were unanimously elected with Dr. A. M. Mazumder as President; Dr. S. S. Ghosal as Vice-President; Dr. M. Barman as Honorary Secretary; Dr. A. Thakur as Asst. Secretary; Dr. T. Tarafder as Treasurer; and Dr. J. N. Adhya as Box offices Auditor.

At a condolence meeting the members placed on record their deep sense of sorrow and irreparable loss at the sad and sudden demise of their beloved colleague Dr. Sashi Bhusan Dutta, an ex-president and founder-member of the branch.

BERHAMPUR (ORISSA) BRANCH—A meeting was held on 9-11-61 with Dr. S. N. Gantayat in the chair. The minutes of the last meeting were read and confirmed. The audited accounts of the branch and the Reception Committee were passed.

The following were elected as office-bearers for 1961-62 : President—Dr. S. N. Gantayat; Vice-President—Dr. B. C. Bisal; Secretary—Dr. V. Prakasa Rao; Joint Secretary—Dr. M. V. Ramayanyya; Representative to State Working Committee—Dr. S. B. Palit; Representative to Central Council—Dr. V. Prakasa Rao. Members, State Council—Dr. K. N. Kar, Dr. R. P. Choudhury, Dr. S. N. Maharana, Dr. R. Krishna Rao, Dr. K. Satyanarayana Rao, Dr. P. Satyanarayana, Dr. B. C. Bisal, Dr. S. S. Mohanty, Dr. G. Krishnamurty, Dr. M. V. Ramanayya.

The Association resolved to request the District Collector, Ganjam, to grant a suitable site in the Berhampur Municipality for the construction of a permanent building for the branch and Drs. S. B. Palit and S. S. Mahanty were requested to take preliminary steps in the matter.

The branch placed on record the high appreciation of the work carried out by Dr. M. V. Ramanayya, as the secretary of the Association for the last 25 years and resolved in appreciation of his services, to present him with a suitable memento.

The house thanked the office-bearers of the last year for the efficient conduct of business of the house, and offered a hearty vote of thanks to the president for conducting the business of the house and the hospital authorities for placing the hospital premises at its disposal for the meetings.

DARBHANGA BRANCH—The annual general meeting of the branch was held on 13-11-61 at 7-30 P.M. in the Senior Lecture Theatre of the Medical College under the presidentship of Dr. B. P. Singh.

The following office-bearers were unanimously elected for 1961-62 : President—Dr. T. B. Gupta; Vice-Presidents —Dr. Safdar Ali Khan, Dr. P. N. Sinha; General Secretary—Dr. K. P. Agrawal; Jt. Secretary—Dr. S. K. Sarkar; Propaganda Secretary—Dr. Miss R. S. Ghosh; Treasurer—Dr. A. D. Chatterjee; Auditor—Dr. S. M. Mishra; Members, State Council—Dr. T. N. Jha, Dr. S. Hoda; Member, Central Council—Dr. T. C. Gupta.

An anti-epidemic relief sub-committee was formed consisting of Dr. S. D. N. Sinha, Civil Surgeon and S.E.M.O., Darbhanga, the D.M.O., the H.O., Darbhanga Municipality, Dr. L. Kant, Dr. S. K. N. Sinha, Dr. Surendra Singh and Dr. K. P. Agrawal, General Secretary (*ex-officio*) with Dr. Safdar Ali Khan, Superintendent, D.M.C.H. and Vice-President as the organiser and convener of the committee to take suitable preventive and curative measures against the cholera epidemic in the town. It was also resolved to raise a suitable fund for flood relief in the State.

KHARGPUR BRANCH—A clinical meeting was held on 18-11-61 under the presidentship of Dr. S. Sen at Rly. Hospital Out-door.

Dr. S. Sen gave a lecture on Public Health in Leprosy. This was followed by Treatment of Leprosy by Dr. A. K. Chakravorty. Ciba Pharma showed a film—"Tendon free grafting in a case of Leprosy with intrinsic paralysis of hand".

KUMARDHUBI BRANCH—At the general meeting held on 19-11-61 at Kumardhubi Hospital, the following

were elected as office-bearers for 1961-62: President—Dr. (Mrs.) S. Prabhu; Vice-Presidents—Dr. S. K. Kar, Dr. S. D. Palit; Hony. Secretary—Dr. K. B. Das; Hony. Jt. Secretary—Dr. B. N. Sen; Treasurer—Dr. B. B. Sarkar; Auditor—Dr. B. B. Ghosh; Representative to the State Council—Dr. B. B. Sarkar; Representative to Central Council—Dr. (Mrs.) S. Prabhu.

MEERUT BRANCH—At a meeting the members condoled the sad death of Ramesh Kumar Maheshwari son of Dr. A. S. Maheshwari, immediate past President of the branch and expressed the deepest condolence to the bereaved family.

RATLAM BRANCH—The annual meeting of the branch was held on 28-10-61. Dr. Ratan Lal Chordia presided. The following were elected as office-bearers for the year 1961-62: President—Dr. V. Sant; Vice-President—Dr. R. B. MacClure; Secretary—Dr. Fazal Haq; Treasurer—Dr. Phadnis; Joint Secretaries—Dr. G. S. Saxena, Dr. B. D. Pandit.

SHILLONG BRANCH—The following is the six-monthly report of activities of the branch from 1st April to 30th September 1961.

The annual general meeting of the branch was held on April 8, 1961. Office-bearers were elected.

Farewell was given to Dr. J. E. B. McPhail, Senior Medical Officer, W.H.O. and Dr. Mrs. McPhail on the eve of their departure to Lucknow.

A combined clinical and general meeting of the branch was held on May 13, 1961, at the Welsh Mission Hospital. A symposium on Peptic Ulceration and its Complications was held. Nomination for Presidentship and Vice-Presidentship for I.M.A. Centre was considered. The report of the sub-committee for Government Contributory Health Service Scheme was considered. It was resolved that the said sub-committee with the new president and secretary be authorised to finalise the proposals, and submit the outlines of a scheme to the Government.

A meeting of the sub-committee for Government Contributory Health Services was held on May 18, 1961. The outlines of scheme for Contributory Health Services of the State Government employees and their families on panel system with private practitioners was framed. The same was submitted to the State Government on June 6, 1961, for consideration.

Show of medical films on (i) Surgical Closure of Intra-atrial Septal Defect, (ii) Hystero-Salpingography, (iii) Endoscopy and (iv) Methergin, was arranged by the branch with collaborations from M/s. Sandoz Products and was held on 10th June, 1961.

A clinical meeting of the branch was held on July 8, 1961, at the Reid Chest Hospital.

Dr. C. N. Hazarika, Superintendent, Reid Chest Hospital, spoke on Treatment of Tuberculous Pleural Effusion dealing at length about various forms of treatment in vogue at the present time. He compared the different regimens coming ultimately to the conclusion that in his recent series of cases chemotherapy with local instillation of corticosteroid gave the best results. A large number of x-ray plates in different stages of the condition before, during and after the courses of treatment were demonstrated showing the rates of improvement in each line of treatment. Dr. S. Bhattacharyya demonstrated a case of Pseudo-hypertropic form of Muscular Dystrophy.

A general meeting of the branch was held on August 5, 1961. Voting for election of President and Vice-Presidents for I.M.A. Centre were conducted. Dr. J. J. A. Niemer, Senior Medical Officer, W.H.O. gave a very interesting talk on the 'Medical and Health Services in the Netherlands'.

A clinical meetinng of the branch was held on September 9, 1961. The death of Dr. Subodh Mitra was condoled and a condolence resolution passed. Dr. A. B. Roy, Dy. D.H.S., Assam, described the Passive Surveillance undertaken by N.M.E.P. and the role of the general practitioner in the scheme. A film on Anticoagulant received by courtesy of M/s. Evans Medical (India) Ltd., was next shown. Lt. Col. S. M. Basu, A.M.C., then gave an instructive talk on 'Bed-side diagnosis and management of Myocardial Infarction'.

SHIMOGA BRANCH—The annual conference of Shimoga branch was held on October 8, 1961 at Paper Town, Bhadravathi. Sri M. D. Shivananjappa, I.A.S., Chairman, Mysore Paper Mills, Vice-Chairman, Mysore Iron and Steel Works, Bhadravathi, inaugurated the conference held under the presidentship of Dr. B. R. Shama Rao, President of the branch.

In his inaugural address Sri Shivananjappa emphasised on the qualities of an ideal doctor and spoke on the problems of Rural Health Service and the need for research or prevention of Radioactive diseases and heart diseases.

Dr. Shama Rao delivering his presidential address stressed the need and usefulness of organising efficient School Health Service with the full co-operation of all the members of the Indian Medical Association. This he said would not only enable a complete periodical check up of all school children but also would facilitate early detection of diseases and treatment. He also suggested the possibilities of opening "Diagnosis and Treatment Centres" on co-operative basis with co-operation of general practioners and the public. The Scientific session was attended by nearly 100 doctors.

In the morning session Dr. K. I. Vithyalingam, Cardiologist, C. M. C. Hospital, Vellore, spoke on the Medical Aspects and Dr. N. Gopinath, Thoracic Surgeon, C. M. C. Hospital, Vellore, spoke on the Surgical aspects of "Surgery in Rheumatic Heart Disease".

In the evening session there was a symposium on Cirrhosis of the Liver with Dr. S. V. Govinda Setty, Physician, Victoria Hospital, Bangalore, as Moderator.

Dr. M. R. Parthasarathy, Professor, Karnatak Medical College, Hubli, spoke on the pathological aspects. Dr. B. R. Rama Rao, Professor, Paediatrician, Kasturba Medical College, Mangalore, on Infantile Biliary Cirrhosis, Dr. B. K. Chennappa, Associate Professor, Karnatak Medical Colege, Hubli on Management and Dr. K. Krishnamurthy, Professor of Surgery, Karnatak Medical College, Hubli, on surgical aspects.

At the general body meeting the following office-bearers for the year 1961-62 were elected:

President—Dr. J. Boshell; Vice-President—Dr. S. Sreenivasan; Secretary—Dr. G. E. Budiyappa; Treasurer—Dr. B. Shivappa; Representative to Central Council—Dr. B. R. Shama Rao; Representative to State Council—Dr. Ramabhatt and Dr. Shanbhog.

Popular lecture in Kannada on special problems on an industrial town and Family Planning was delivered by Dr. S. Sreenivasan, District Surgeon, Shimoga, Sri B. K. Swamy, General Manager, Mysore Paper Mills, Bhadravathi, presided.

TUMKUR BRANCH—At a meeting of the branch held on October 7, 1961, the following office-bearers were elected for 1961-62: President—Dr. M. N. Mahadeshaiah; Vice-President—Dr. M. Venkatakrishna; Secretary—Dr. C. N. Swami Rao; Joint Secretary—Dr. C. Jayaram Rao; State Council member—Dr. C. Satyanarayana Setty; Central Council member—Dr. T. P. Srinivasamurthy.

EMENDATION

The Bombay Territorial Branch has issued the following emendation to their branch report published under the heading BOMBAY TERRITORIAL BRANCH, in the Supplement to this Journal (**37**: 465, Nov. 1, 1961).

LINES 3 AND 4:

For ".....Hoechst Pharmaceuticals Ld. as a Research Director spoke on the use of Antibiotic Drugs"

read ".....the Department of Medicine, University of Freiburg, spoke on the use of Antidiabetic Drugs"

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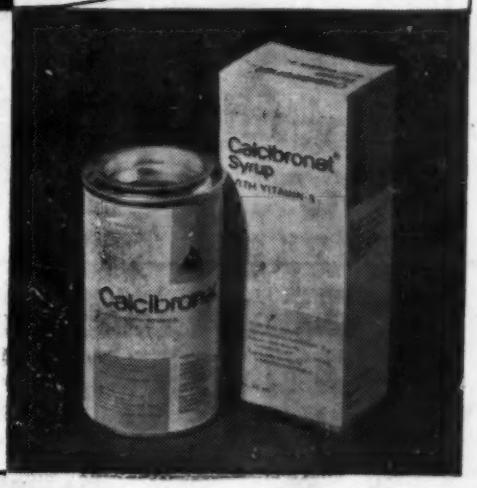

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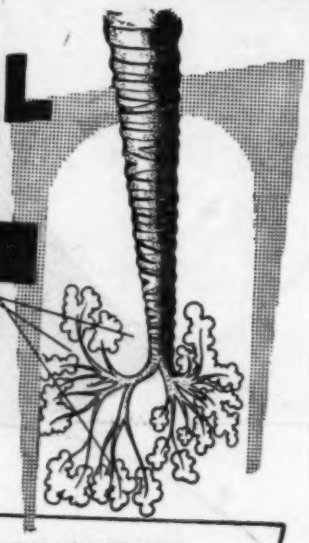

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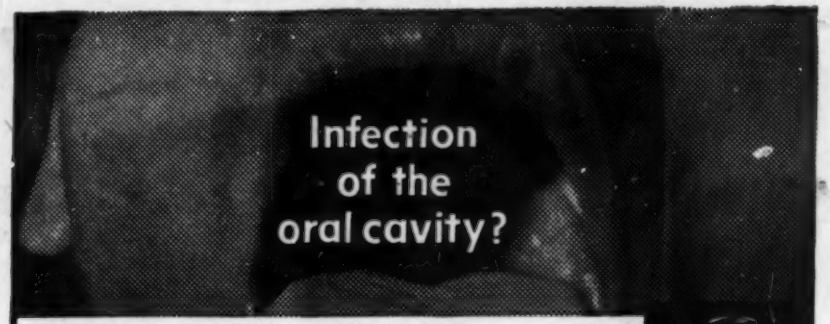

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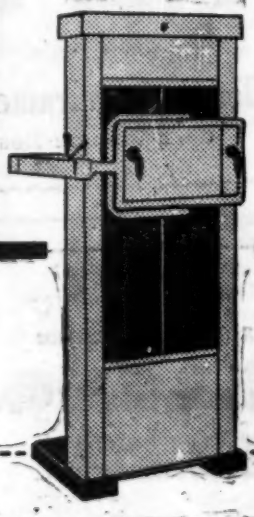

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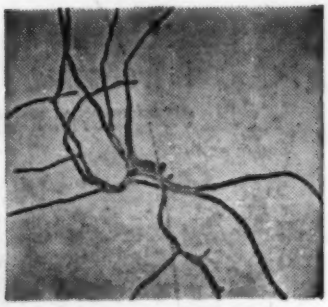
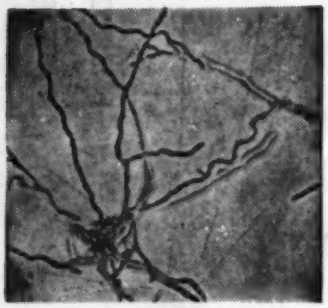


Growth in nutrient with *no* griseofulvin present.



The effect on growth when 0·1 part per million griseofulvin is present.

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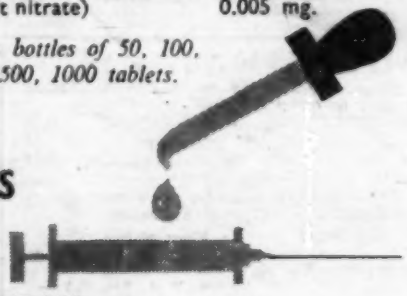

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